SACRAMENTO AIR LOGISTICS CENTER MCCLELLAN AFB CA SERV--ETC F/G 22/2 RESULTS OF A SURVEY SOFTWARE DEVELOPMENT PROJECT MANAGEMENT IN --ETC(U) DEC 79 R H THAYER, J H LEHMAN SM-ALC/MME-TR-79-54-VOL-2 NL AD-A117 998 UNCLASSIFIED 1 № 5

SM-ALC/MME TR 79-54, Volume II 18 December 1979



RESULTS OF A SURVEY: SOFTWARE DEVELOPMENT PROJECT MANAGEMENT IN THE U.S. AEROSPACE INDUSTRY

Volume II

PROJECT MANAGEMENT TECHNIQUES, PROCEDURES AND TOOLS

RICHARD H. THAYER SACRAMENTO AIR LOGISTICS CENTER AIR FORCE LOGISTICS COMMAND MCCLELLAN AFB, CA 95652

AND

John H. Lehman CALIFORNIA STATE UNIVERSITY SACRAMENTO CA 95819

Approved for public release, unlimited distribution.

Any opinions expressed in this report are solely those of the Author and do not necessarily reflect the position of the United States Air Force or the American Institute of Aeronautics and Astronautics Technical Committee on Computer Systems.

Department of the Air Force Headquarters Sacramento Air Logistics Center (AFLC) McClellan Air Force Base, California 95652

82 08 06

The state of the s

SECURITY GLASSIFICATION OF THIS PAGE (When Date Antered)

REPORT DOCUMENTATION PAGE T. MAJORY IN. MAIN SM-ALCTIME TR-79-54 VOLUME II 4. TITLE (and Substitle) Results of a Survey: Software Development Project merement in the U.S. Aerospace Industry Technical, Ma Volume II: Project Management & Techniques. Procedures and Tools T. AUTHOREN Richard H. Theyer (Secremento Air Logistics Center) and John H. Lehmen (California State University, Secremento) 5. PERFORMING ORGANIZATION NAME AND ADDRESS ACT AND THE PARTY OF THE PARTY OF Directorate of Materiel Mangement Volume II: Project Secremento Air Logistics Center Techniques, Procedures & Tool McClellan Air Force Base, California 95652 II. CONTROLLING OFFICE NAME AND ADDRESS 12. ARMONT DATE 4. MONITORING AGENCY NAME & ADDRESSAUL different from Controlling Office) UNCLASSIFIED G. DISTRIBUTION STATEMENT (of this Report)

Approved for public release, unlimited distribution.

17. DISTRIBUTION STATEMENT (of the abeliant entered in Stock 26, if different from Report)

18. SUPPLEMENTARY NOTES

Prepared in cooperation with the American Institute of Assonautics and Astronautics (AIAA) Technical Countities on Computer Systems.

18. KEY WORDS (Commiss on reverse side If necessary and identify by block number)

Software Engineering Project Management, Software Devalopment, Survey, Project Management

38. ABSTRACT (Continue on reverse wide if he obsery and identify by block expedic;

See separate sheet following.

ABSTRACT

RESULTS OF A SURVEY ON MANAGEMENT TECHNIQUES AND PROCEDURES
USED IN SOFTWARE DEVELOPMENT PROJECTS BY THE US AEROSPACE INDUSTRY

BY

Richard H. Thayer and John H. Lehman

This report contains the results of a survey conducted in 1977 and 1978 on how the US Aerospace Industry manages its software development projects. The sample of the US Aerospace Industry surveyed was those companies who had a membership in the AIAA Technical Committee on Computer Systems. These committee members represented 47 major corporations or major corporate subdivisions and occupied top positions in software management within their firms.

The survey used a questionnaire containing 225 numbered questions on project management. By using "multiple choice-multiple answer" questions, approximately 1,328 separate responses were possible. The survey was divided into three parts. Part One dealt with defining the organization, management structure, and philosophy of the firm. This part was intended to be answered by top management to provide the backdrop against which the individual projects would be viewed. Part Two concerned individual software development projects and was intended to be completed by the project manager. Part Three was designed to obtain the opinions and perceptions of software development project managers on major issues and major problems of software engineering project management.

This paper reports the results from Part Two; that portion of the questionnaire dealing with actual projects. Parts One and Three, the portions dealing with the company environment and software development problems, are reported on in Volumes I and III.

The answers from the surveyees were abbreviated or coded and tabulated in this report. In addition, a portion of the narrative answers to the survey were also reported. To protect the participants, all references to individuals or their companies have been eradicated. This report does not attempt to analyze or come to conclusions about the data only to report it as clearly as possible.

TABLE OF CONTENTS

SECTION 1 F	RESULTS.					•	,					1
SECTION 2 1	THE DATA			•								13
SECTION 3 F	REFERENCE	s ,			,			1				223
APPENDIX A	CONTRIBU	TORS										225
APPENDIX B	QUESTION	NAIR	Ε									229
APPENDIX C	Comments	ON	AN:	D.	Αв	BR	E۷	ΙA	ΤI	ON	S	
	USED IN	THE	RE:	DU	СТ	10	N	OF				
	Answers											293
APPENDIX D	NARRATIV	E AN	D.	Ca	ND	ΙD	(CL	EΑ	R		
	TEST) AN	SWER	S	то	S	EL	EC	TE	ם			
	QUESTION	s ,										333



Acces	ssion For	
1	ISACD	X
Dyna		
	nounced Effection	
J:1 C.		
P.y.		
	-42 mg/	
av:	lloh" lity	Codes
	Avela on	•
Dist	Sphalal	L
H		
	<u> </u>	

SECTION 1

RESULTS

BACKGROUND

The survey in the title of this paper was a survey of the US Aerospace Industry to determine what management techniques and procedures are used by the aerospace industry in their software development projects.

This survey was designed, written, tested, and implemented by the authors in the spring and summer of 1977. This survey was accomplished to collect data for the preparation of a paper on software engineering project management which was presented at the American Institute of Aeronautics and Astronautics (AIAA) Conference, Computers in Aerospace, 31 Oct - 2 Nov 1977.

That portion (or sample) of the US Aerospace Industry that was surveyed were those companies who had a membership in the AIAA Technical Committee on Computer Systems (who were the host to the conference on Computers in Aerospace). These committee members represented 47 major aerospace corporations or major corporate subdivisions and occupied top positions in software management within their firms. These committee members were in an ideal position to report on how the US Aerospace Industry manages its software development projects.

Initial contact was made in May 1977 to determine which members of the committee would be interested, willing, and able to participate. Forty-five members, representing 35 companies, agreed to respond. The initial draft of the survey was completed in June 1977 and was critiqued by approximately 25% of the total committee membership. The results of this critique, along with other corrections, were incorporated into the final survey. The survey was mailed 10 August 1977. On 6 September 1977, with 29 of the completed surveys on hand, the authors wrote the first report for the proceedings of the Computers in Aerospace conference. This paper can be found in the conference proceedings, A Collection of Technical Papers. By the time the presentation was given on 1 November 1977, 55 projects were reported on, representing 33 companies or 70% returns. The companies surveyed were predominantly aerospace firms, with government contracts, reporting on large to very large projects. The presentation

given by author Richard H. Thayer at the conference (called Report Nr 2, AIAA Project Management Survey) used the more complete data and a different approach.

However, the survey did not end there. More completed forms still trickled in until by the spring of 1978, 62 projects had been reported on, representing 37 firms for a 76% return rate. This later increased to 66 by the end of the summer 1978 for 86% return rate (see Appendix A for a list of participants). Because of this extensive participation, a decision was made by the AIAA Technical Committee on Computer Systems to make further use of the data by writing an assessment paper on the state-of-the-art in software development project management. Mr. Gene F. Walters, General Electric Company, Command and Information Systems, and Mr. Jack E. Bloodworth, Boeing Aerospace Company, were given primary responsibility for this paper.

In order to meet these goals, the Rome Air Development Center, the Sacramento Air Logistics Center, and The Boeing Aerospace Company offered their services, and in some cases the services of their company's data processing capability, to reduce and analyze the data.

The remaining problem was to reduce the data into a form useable by a computer. This involved "coding" the narrative portions and free form answers of the survey, verifying that the answers were consistent, and abbreviating all "fill in the blank" answers. This was accomplished by one of the architects of the survey, Richard H. Thayer.

PURPOSE OF SURVEY

The purpose of this survey was to view a sample of the US Aerospace Industry through the use of a questionnaire to determine how this industry managed their software development projects. Specifically, the questions the survey attempted to answer were as follows:

- 1. What are the current practices in Software Engineering Project Management today?
- 2. Are the new developments in management, i.e., "modern" management techniques or project management techniques, being used?
- What are the trends in the Software Engineering Project Management?

- 4. What are the relationships between Software Engineering Project Management techniques and successful delivery of software?
- 5. What are the relationships between various elements of Software Engineering Project Management as a system?
- 6. What are the relationships between "modern" Software Engineering techniques and Software Engineering Project Management?

THE SURVEY

The approach taken in answering the questions was first to design a model of software engineering project management as a system, define the elements of that model, and hypothesize relationships between those elements. Second, was to form a questionnaire around this model using the various elements or variables of the model as questions and possible answers (see Appendix B for a copy of the questionnaire). The survey used a rather lengthy questionnaire containing 225 numbered questions. Beyond that, by using "multiple choice-multiple answer" questions approximately 1,328 separate responses were possible.

The 72 page survey was divided into 3 parts. Part One dealt with defining the total organization, management structure, and philosophy of the firm. This part was intended to be answered by top management to provide the backdrop against which the individual projects would be viewed. Part Two concerned individual projects and was intended to be completed by the project manager. Part Three consisted of general questions, not project specific, calling for evaluation, opinions, and suggestions on the major problems of software engineering project management. Part Three was also intended to be completed by a project manager. PURPOSE OF THIS REPORT

This report was prepared as a means of (1) reducing the answers to Part Two and Questions 1, 2, 3, 4, and 25 of Part Three of the question-naire in "raw form" so that they could be computerized, and (2) providing the answers to the questionnaire to satisfy the many requests from the computer community for access to the data collected as a result of this survey. (The answers to Part One and the remainder of Part Three are provided in Volumes I and III.) Because of the restrictions placed by the participants on the use of their submissions, the survey forms with the complete answers cannot be distributed. This report was selected as a means of capturing and documenting as much of the raw data as possible without revealing the source of the information. In essence, this report does not contain "raw data," but reduced data in abbreviated and coded form which will effectively disguise the participant but still allow interested computer scientists to

use the data for their own requirements.

This report does not attempt to analyze or come to conclusions about the data, only to report it as clearly as possible. Only minimum interpretation was made to enable the answers to be tabulated for eventual analysis. Although 66 projects were reported, the authors removed six projects that did not seem to fit the norm, leaving a set of 60 projects.

CONTENTS OF THIS REPORT

As already stated, the purpose of this report is <u>not</u> to analyze the data from the AIAA Project Management Survey, but to report it as simply and accurately as possible, and, to keep within the original ground rules of maintaining anonymity of the participants. Section 2 contains the questions and answers to this survey and Section 3 contains cited references. The participants in the survey are listed in Appendix A.

Because of its length a duplicate copy of the questionnaire is in Appendix B. The purpose of this duplicate set is to allow the reader to quickly peruse the questions and possible answers in order that he can determine what type of material is covered.

Appendix C contains the abbreviations used in reporting the narrative portions of this survey as well as comments on the answers themselves. These comments pertain primarily to such things as accuracy of the answer, relationship between questions, and procedures used in contriving missing answers. Since the reduction of comments to code destroyed some of the richness of prose, the authors felt it worthwhile to include the actual written answer to certain specific questions. These answers are reproduced in Appendix D. To maintain the concept of protecting the participants identity, the narrative answers cannot be tied to any particular participant in Section 2.

THE FUTURE

This survey is, as far as the authors can determine, the first attempt to query industry on such a large scale on how software engineering projects are managed. A look at the list of contributors in Appendix A will attest to the importance of this base of answers. The tremendous volume of questions answered and the excellence of the responses dictate

that this data be utilized either in whole or part as a reference for other papers, reports, possible texts, and other technical publications for the benefit of the US Aerospace Industry and the data processing community. The AIAA Technical Committee on Computer Systems is anticipating the preparation of an assessment paper on how industry manages its software engineering projects. This committee welcomes suggestions from the computing and aerospace communities on how to best use this data for the benefit of all. All suggestions should be sent to either:

Mr. Gene F. Walters
Mgr, Software Technologies
Information Systems Programs
General Electric Company
450 Persian Drive
Sunnyvale, CA 94086
(408) 734-4980

Mr. Jack E. Bloodworth Mgr, ALCM Software The Boeing Aerospace Company MS-45-70 P.O. Box 3999 Seattle, WA 98124 (206) 655-6718

The Rome Air Development Center (RADC) has contracted with ITT Research Institute (IITRI) to establish and operate a software information analysis center. The center has been named the Data and Analysis Center for Software (DACS). One of the functions of DACS is to acquire and analyze data gathered during the various phases of the software development process with the purpose of identifying and quantifying those factors which contribute to the production of quality software. The data from this survey has been contributed to DACS and is available for analysis by any member of the AIAA Technical Committee on Computer Systems as well as the general computer community. Personnel interested in receiving copies of this data, or requesting analysis of this data should contact:

Ms. Lorraine Duvalle
Data & Analysis Center for Software
RADC/ISI
Griffiss AFB, NY 13441
(315) 336-0937

ACKNOWLEDGEMENTS

In addition to the contributors listed in Appendix A, the authors wish to acknowledge the support and dedication of the following people.

From the Sacramento Air Logistics Center

The Data Automation Branch provided programmers, analysts, typing support, computer processing, and integration of the final report.

Personnel who provided programming and analyst support are:
Ms. Bonnie J. Nieland, Mr. Lee M. Hanger, Mr. Robert D. Heckler,
Mr. Grover "Bob" Collins, Mr. John W. Robino, Mr. Larry A. Morris,
Mr. David E. Sturdevant and Mr. Lloyd H. Jones. The Data Automation
Branch, Operations Section, provided computer processing. Ms. Brenda D.
Harris, Ms. Sheryl A. McCauley, Mrs. Ruth L. Wilson and Mrs. Betty J.
Smith did an excellent job of keypunching.

The following secretaries provided typing, proofreading, and composing support: Mrs. Beryle E. McPheeters, Mrs. Marianne L. Muegger :g, Mrs. Betty J. Smith, Ms. Sheryl A. McCauley, Mrs. Deanna May and Ms. Lois Wauzinski.

From the Boeing Aerospace Company

The Boeing Company's integrated logistic and systems maintenance ..., consisting of Mr. D. H. Wilson, Mr. G. R. Herrold, and Mr. W. B. Dalrymple, provided support in the areas of data reduction, data base structure, and file updating and verification. Dr. Kenneth A. Hales, 1977 president of the AIAA Technical Committee on Computer Systems, provided the support of his committee in testing and completion of the questionnaires.

From the General Electric Company, Space Division

The Information Systems Program in Sunnyvale provided technical consultant support, proofreading, printing and encouragement through the services of Mr. Gene F. Walters and his technical group.

From the Rome Air Development Center

RADC has offered to perform analysis of the data for the benefit of the US Air Force, the AIAA Technical Committee on Computer Systems, and the computing community. Personnel responsible for this are Mr. Donald Roberts and Mr. Alan R. Barnum. Ms. Lorraine Duval, ITT Research Institute, who is general manager of the RADC Data and Analysis Center for Software (DACS), became the repository of the data from this survey and provided much of the reduction and statistical correlation.

ATTACHMENT 1 TO SECTION 1

RELATIONSHIPS BETWEEN REPORTS

The survey was comprised of three parts: Part One, Part Two, and Part Three. Each dealt with a separate facet of software engineering project management. Part One dealt with the firm and the environment in which the project was done. Part Two devoted itself to specific software engineering projects accomplished within the firm. Part Three asked the project managers their opinions about project management. Each of these parts can, and does, stand alone. Part One (results reported in Volume I) reports on the financial status, organization, management policies, staffing techniques and project controls of the companies that report on the projects in Part Two.

Part Two (results reported in Volume II) reports on a series of independent projects which could be considered case studies on how the aerospace industry is managing projects today. Part Three (results reported in Volume III) concerns ideas and perceptions about software engineering project management and does not relate to a given project or company.

At the same time, there is a relationship between these reports. For instance, you might be interested in knowing about the company environment that produced the project. In that case, you would want to know which company reported on which projects. You might be interested in knowing the background and project environment which created the ideas and assumptions made in answering Part Three. In that case, you would want to know the relationship between the man who reported the perceptions, ideas and problems associated with software engineering project management and the project he worked on. To this aim Table 1 tells the relationships between Volumes I, II and III of this report.

Each survey answer was given a number for tracking purposes. Within this number, of course, is a Part One, Part Two, and Part Three. Since one Part One might cover a number of Part Two's, and the Part Three may or may not be answered by the same person that answered Part Two, the relationship between these is contained in the table. Each company was given a two-digit identifier, each project was given a three-digit

identifier, and each answer to Part Three was given a three-digit identifier. To determine the common company relationship between projects, look up the common company identifier in Table 1. To determine whether or not the same person answered Part Two and Part Three, look under the column that identifies Part Three. If the entry is "yes", the same man wrote Part Two and Part Three. If the entry is "no", a different individual answered each part.

Projects 301 through 306 have been deleted for this report due to size or incompleteness.

10 TABLE 1

(ATTACHMENT 1 TO SECTION 1)

RELATIONSHIPS OF PROJECTS APPORTED IN ALAA

PROJECT MANAGEMENT SURVEY

VOLUMES I, II and III

Survey Identification Nr (1)	VOL I (Part One) (2)	VOL II (Part Two) (3)	VOL III (Part Three) (4)
101	30	101	Yes
102	30	102	Yes
103	30	103	Yes
104	31	104	Yes
105	33 (8)	105	Yes
106	34 (8)	106	Yes
107	35	107	Yes
108	35	108	Yes
109	35	109	Yes
110	36	110	Yes
111	36	111	Yes
. 112	39 (9)	112	Yes
113	40 (9)	113	Yes
114	41	114	Yes
115	69	115	No
116	42	116	None
117	43	117	Yes
118	45	118	Yes
119	45	119	Yes
120	51	120	Yes
121	66 (5)	121	Yes
122	51	122	Yes
123	51	123	Yes
124	51	124	Yes
125	52	125	Yes
126	55	126	Yes
127	None	127	Yes
128	59	128	No
129	None	129	Yes
130	31	130	Yes
201	67	201	None

(1) Survey Identification Nr	(2) VOL I (Part One)	(3) VOL II (Part Two)	(4) VOL III (Part Three)
202	27 (7)	202	Yes
203	28 (7)	203	Yes
204	29	204	Yes
205	32	205	Yes
206	37	206	Yes
207	37	207	Yes
208	38	208	Yes
209	43	209	Yes
210	44	210	Yes
211	46 (10)	211	Yes
212	47 (10)	212	Yes
213	49	213	Yes
214	49	214	Yes
215	49	215	Yes
216	49	216	Yes
217	50	217	Yes
218	53 (11)	218	Yes
219	54 (11)	219	Yes
220	56	220	Yes
221	57	221	Yes
222	60	222	Yes
223	60	223	Yes
224	58	224	Yes
225	58	225	Yes
226	58	226	Yes
227	61	227	Yes
228	61	228	Yes
229	64	229	Yes
230	68	230	Yes
301	26 (6)	301	Yes
302	48 (10)	None	None
303	25 (5)	None	None
304	68	304 (12)	None
305	62	None	None
306	63 (7)	None	Yes

FOOTNOTES FOR TABLE 1

- (1) Column 1 This column lists the returned surveys according to a randomly assigned identification number.
- (2) Column 2 The company identification number is listed in column 2 and is used in Vol I to describe the company and environment for the project reported in Vol II. Projects with the same company number are from the same company and/or major subdivision and were completed by a single member of the company. In other cases, the same company was reported on by two or more individuals. This was caused by two or more project managers, who reported on different projects within the same company. Most of the time these "double" reports were the same. Comments along these lines are contained in foot notes (5) through (12).
- (3) Column 3 This column lists the project numbers reported in Vol II.
- (4) Column 4 Vol III reports on data from Part Three. This column indicates whether or not the same person reported/wrote Part Two and Part Three of the survey. This is done so that the reader can know if there is any relationship between the project reported on in Part Two and the surveyee's opinions on the major problems of software development management. Source of this information is personal knowledge of the author, comparison of handwriting, color of marker, and correspondence with the surveyee.
 - (5) Company 25 and 66 are the same.
 - (6) Very small company.
- (7) Company 27, 28 and 63 are the same. Answers reported under company 28 looked to be the most accurate and complete.
- (8) Company 33 and 34 are the same. Answers reported under company 33 looked to be the most accurate and complete.
 - (9) Company 39 and 40 are the same and have identical answers.
- (10) Company 46, 47 and 48 are the same. Answers reported under company 46 are considered to be the official answers by the surveyee.
- (11) Company 53 and 54 are the same. Answers reported under company 54 looked to be the mose accurate and complete.
 - (12) Project reported under project 304 was too large to be included.

SECTION 2 THE DATA

INTRODUCTION

This section reports on the actual data submitted by the participants on sixty aerospace projects. It is reported in tabulated, abbreviated and coded form and cannot be used completely without Appendix C. Every effort was made to disguise the contributor, including the deletion of some revealing data.

The questionnaire contained many different styles of questions: true or false, multi-choice answers, multi-part questions, fill-in-the-blarks, and narrative. Despite this multitude of styles, a common method of reducing and reporting the answers was developed (see Appendixes B and C). Multi-part questions were broken into separate questions through the use of part numbers (i.e., 01, 02, 03, etc.) and sub-part designator (a, b, c, d, etc., and 001, 002, 003, etc.).

Each question is handled separately and reported as an array. The horizontal indices of the array refer to anonymous project identification numbers (see Section 1 for further explanation). The vertical indices refer to the question, part, and subpart number. Every narrative answer has been coded or abbreviated by a three-character alphanumeric (see Appendix C for further explanation of codes).

Generally speaking, the printing of a three-character alphanumeric opposite the subpart of a question indicates that the participant answered "yes" or "true" as it applies to that part of the question. If a given question has a "blank" for an answer this indicates the surveyee answered "no" or "false" as pertains to that part of the question. With the exception of "none" or "missing" the alphanumeric is a code or abbreviation of a text answer that m lifties the "yes" answer. The interpretation or meaning of the codes can be found in Appendix C. The authors made every attempt to use codes that were easy to recognize (mnemonic).

The questionnaire as printed in this report is a modified version of the questionnaire as originally answered (see INTRODUCTION TO APPENDIX B, Questionnaire for explanation).

	RESPONDUR 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	205	C02 C05	503	C02			204 216 211 212 254 255 255 255 255 155 055 015 818 115 818 218 218 218 218 219 219	CO2 CO2 CO3	502			C02	
NE PONTING	122 123 124 125	C02 C02 C02		C 0 2				125 425 E25 227		CO2 CO2 CO2 CO2			C02	
MASZIS YOUM POSITION IN RELATION TO THE PROJECT YOU ARE MEPOHTING (OHIGINALLY NAMATIVE) HOJECT MANAGEN OFTWANE PROJECT MANAGEN ROJECT MANAGEN'S SUPERVISOR (PROGRAM MANAGER) ECHNICAL DIRECTON ON TECHNICAL ADVISOR HOJECT INDIVIDUAL ORPORATE OFFICER USTOMER	121 021 611 911	C02 C02	C02				203	155 055 615 815		CO2 CO2 CO2		C 0 2		
/IS YOUW POSITION IN HELATION TO THE PROJE ECT MANAGEN WANE PROJECT MANAGEN ECT MANAGEN'S SUPENVISON (PROGRAM MANAGEN) NICAL DINECTON ON TECHNICAL ADVISON ECT INDIVIDUAL OMEN	114 115 116 117	C02	CO2 CO3 CO3 CO3					214 215 216 217	. C02	CO2 CO2 CO3				
MASSIS YOUN POSITION IN KELATION TO THE OPLIGIMALLY NAKHATIVE.) PROJECT MANAGEN SOFTWARE PROJECT MANAGEN FROJECT MANAGEN'S SUPERVISON (PROGRAM M TECHNICAL DIRECTON ON TECHNICAL ADVISON FROJECT INDIVIDUAL CORPONAIE OFFICEN OTHER	110 111 112 113	CO2 CO2 CO3	C02 C02					210 211 212 213	CO2 CO2	C02 C03				
MHAI WAS/IS YOUN POSI ON? (ONIGINALLY NAKE, A. PROJECT MANAGER B. SOFIWAME PROJECT C. PROJECT MANAGER'S F. CONDICAL DIRECTO E. PROJECT INDIVIDUAL F. CONFORMIE OFFICER G. OIMER	00 107 108 109	C02 C03	.02			C02			C02 C02	C02 C03				
	NDUR 02 103 104 105 1	C02 C02	C02 C03		C02			RESPONDOR 201 202 203 204 205 206 207 208	J	C 0 2	C02	C62		C 0 2
OUE 3 1 1 0 M	RESPONDUR Part/sub 101 102 1	0 1 A C	01 B C02	3 10	0 10	01 E	9 I F	RESPONDOR Pami/sub 201 202 2	٥، ٨	9 10	01 C	01 D C05	01 E	9 10

QUE ST I UN	•		Z	IN WHA!	447	APPL 1CA	APPLICATIONS/FUNCTIONAL (ADDE D)	JNU 4/	.1 1 EN	(Y T Y)	8 A (S	AMEA(S) DID THIS (SOFIWANE) PHUJECT	111)S S	F I WA	¥E) 1	HUJE (y-						
			4 305.	PRO	MERC COUNT TA AC IENTI HULAT OCESS	ING WUIS FIC.	BUSTA AND F ITTON SUCH SUCH FROL	AS E DELLIN	SUCH STEVA S	AS	INVEN 46 CA ATTON SEDDE	COMMERCIAL/HUSINESS, SUCH AS INVENTURY CONTRUL, PAYFULL, ACCUUNTING AND FINANCE, ETC. DATA ACUUISITION/HETHIEVAL SCIENTIFIC, SUCH AS ENGINEERING CALCULATIONS, DATA REDUCTIONS, ETC SIMULATION OF MODELING APPLICATIONS PROCESS CONTROL TO INCLUDE EMBEDDED COMPUTER SYSTEMS (MANLEY,1974)	CONT	S. DA	PAYH ITA H	ULL, EUUCT (MAN	L, PAYHULL, Data Neductions, etc Systems (Manley,1974)	E1C						
					COMMAND MANAGEME COMMUNIC CUMPUTER OPERATIN	CATICANT RENT SYLVEN	COMMAND AND LOWIND, STSTEMS MANAGEMENT INFOUNDATION SYSTEMS, COMMUNICATION SYSTEMS, SUCH AS SCOPELATING SYSTEMS AND UTHER UTHER	MATIC STEMS STEMS S AND	S. ME	SYSTEMS SYSTEMS MESSAGE AS SUFT THER SY	S SEL	L STSTEMS TION SYSTEMS EMS. MESSAGE SWITCHING SUCH AS SUFTWAKE MUNITONS, AND UTHER SYSTEMS SOFTWAKE	JG TUKS TWAK		COMP 1LEKS	Š,								
PAK1/80B	KESPONDOR 101 102 103 104 105 106 107	104 105	106		1 99 1	1 60	108 109 110 111 112	-	= 2	2.	115	113 114 115 116 117 118	7 7 7	11 81	119 120	121 0	121 125	123 124	124 1	25 15	951 126 127 128 129	1 128	129	130
A 10		YES		_	Yt S													res						YES
9 10													•			Yt S		YES	>	YES				
) 10	YES			YES.					YES				>	YES YES	eg.				YES	7	YE 9			
0 10	YŁ S																YES		YES	*	YES			
01 E	res		£ 0 3		>	YES		C 0 3	~		YES YES	Yt S			C 0 3	~1			£ 0 3		¥.	YES CO3		
9 10	YES YES YES					ž	res res	Ø	763	76.5			YES		YES	øy.			Y E 9	Ξ	Yts			
9 10																	72.5							
1 0	YES															YES			YES	¥	YES		YES	
1 10	YES YES	YES		YES														YES	7E.S	¥	YES			
PART/SUB	RESPONDOR 201 202 203 204 205 206 207	204 205	206		2 902	2 60	209 210 211	1 212		1 214	213 214 215	216	211 2	218 2	22 61	0 221	PS 252 257 127 927 612	223	2 427	225 2	226 227	7 226	228 229 230	230
۲ 5																					46.8	S YES		YES
9	76.8		YES					YES	'n				YES Y	YES		YE.S				YES				
91 0			YES										_	YŁS					Yt. S			YES		
0			YES		-	YES							>	871	YES	Ø				Ξ	Y E S		rt s	
91 15	03		YES	C 0 3		>-	YES YES	ø					~	71.3								C 0 3	_	
9 10	128 128	76.5		- -	YES Y	YES			YES	YES YES	YE S	YES	>	YES YI	YES		YES		YES	⋝	YES			
ī	Y£ S			-	003													YES						
10		003			_	YES	X.	YES YES	æ				>	76.9	YES	s						7 t s	_	

u£ s	NC 8 1 1 0 N	m					- 		INE PROJECT WASS A. A NEW SUFTWATE B. A CONTINUATE C. A MAJON MODE	# RC	MASI F TWA UATI MUDI	PROJECT WAS: A NEW SUFTWARE DEVELOPMENT A CONTINUATION OF A PREVIOUSLY COMPLEJED SOFTWARE DEVELUPMENT A MAJOR MODIFICATION OF AN EXISTING SUFTWARE SYSTEM OTHER	EVEL F A 1	PREV	TOUSI NN t)	., C0	HPLE NG S	140 UF 1%	SOF TO	SYST	E E	1.07	# N.1								
ART	ART/SUB	HES.	HESPONDOR Ici 102 1	MESPONDOR 1c1 102 103 104 105 106 107 10	2	101	701 5	0 - 4	7 101	9 0	=	18 109 110 111 112 113 114 115 116 117 118 119 120 121 123 124 125 126 127 128 129 150	Ė	Ξ	2 = 1	115	911	1117	118	-13	120	171	122	123	124	125	126	157	1 82	29.1	80
4 :0	<	YES	YE	YES YES YES			YES	'n	YE	SYE	s YE	YES YES YES YES YES YES YES YES	3 × k:	3 YE:	3 YE	× + 5	YES		YES	YES YES	YES	YES YES		Yt s	YES YES YES	Yt S		_	YES Y	YES C04	70
5	23							Yt S	s														YES								
) IO	J				76.5	YES YES	ø,	76.5	v)									YES			YE.S		YES				YES YES	rEs			
ARI	ART/SUB		HESPONDOR 201 202 20	HESPONDOR 201 202 203 204 205 206 207 208	1 204	1 205	2 20(9 50	7 201	8 20	9 21	209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 224 227 228 229 230	1 218	212	3 210	215	216	2117	218	219	220	221	242	223	224	225	526	227	2 92	2 42	3.0
5	<		YES	YES YES YES YES YES YE	ı YES) YE	S YE	SYE	S YE	S YE	YES YES	S YES	'n					YF S	YES	YES	xt s	Yt S	YES YES YES YES YES YES	YE S		C 0 3		rES	YES YES YES	E S	
5	2													YES	6		C 0 3									C 0 3			YES		
01 C	ပ	YES								YE S	so.		YE S	د م	rt s	res									YE S	YES CO3 YES	7 E S	_	YES	>	YES

20E 31 I DN	un.				F 4 B U G W F N	2	SUF TWANE COMMERCI COMMERCI COMMERCI COMMERCI MUDIF 1EC MUDIF 1E SPECIAL SPECIAL	AKCIA KCIA KCIA HED AL P AL P	CK CCC CCC CCC CCC CCC CCC CCC CCC CCC	# # # # # # # # # # # # # # # # # # #	MASS RE-SH AL O AL O PERA	PRODUCT MAS DESIGNED FOR AL UFF-THE-SHELF CURPULLS AL UFF-THE-SHELF UPEHAIIO CUMMERCIAL OFF-THE-SHELF COMMERCIAL UFF-THE-SHELF FOUNDUSF COMPUTER (HANDWAN PUNPOSE OPEHAIING SYSIEM	CONFERENCE OF ENCINE STATE OF ENCINE STATE OF ST	TO T	SUFIWARE PRODUCT MAS DESIGNED FOR: COMMERCIAL UFF-INE-SHELF COMPUILM MARDWARE COMMERCIAL UFF-THE-SHELF OPENAING SYSIEM MUDIFIED COMMERCIAL UFF-THE-SHELF COMPUIEN MARDWARE MUDIFIED COMMERCIAL UFF-THE-SHELF UPFHAIING SYSIEM SPECIAL PURPOSE COMPUITEN (MARUWANE) SYSIEM (ADDED) SPECIAL PURPOSE UPENAIING SYSIEM	DWAR SJEM FUIE YSIE	E SE	KUWA Ysił Dueu		(ADUE I)	3								
PAKT/SUB	NESPONDUM 101 102 103 104 105 106 107	DUK 2 103	104	105	106	107		104	110	=	112	113	411	115	108 109 110 111 112 121 121 121 121 120 121 120 121 121	1117	118	-	120	121	122	123	124	521	1.56.1	1 721	28 1	52	20
A 10			rt S	res res		YŁ S		YES	YES YES YES	YES		YES	YES YES			Yt s	YES	YES YES CO4		YES	YES YES CO3 YES CO4 YES	C 0 3	YES	1 10 3	rt s				YES
9 10				Y£ 3		YES	1 16 5			YE S										YES				£03					16.5
0 10								YES											200			YES				-	res		
01 E	CO3 YES YES	3 YES			YES						YES			YES	YES YES				YE S						res 1	LS C	YES YES COL YES	S	
01 F	603	YES	, •						71.9		YE S					Yt S							YES						
PART/SUB	HESPONDOH 201 202 203 204 205 206 207	204 2 203	204	202	206	207		209	210	211	212	213	214	215	208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 224 250	217	218	219	220	221	252	223	224	5.55	7 977	27.2	7 97	5 45	9
4 10		YES		YE S	YES YES			YES			0.0					¥ 5	Y & S		YES	YES YES			YES	YES YES YES YES CO4 YES	res 1	'ts c	¥ 40	t S	XF.S
9 10								YES											YES						tes rės	es.		_	YES
91 C	TES TES	•					C03																						
0 10	YES YES	-					C 0 3										C 04						YES			>	YES		
9 10			Y E 3	YES YES		C 0 3		YES	YES	YES		C 0 3	CO3 YES YES	YES	res			YE 3			YES YES	YES							
01 F	YES		YES					YES		YES	YES YES					YES								Yt S			>	YES	

		130		YES		250		Yt S		
		129			C 0 1	622		YES YES		
		128			CO1 NUN CO1	228			703	
		121			103	122			CO2 CO2	
		971	YES	8 7	_	978		0.1		
		\$21		YES YES		55.		't s (
		124	rt s	_		7 7 7		YES YES COI		
22		57	YES YES			5.53		_		N O
PUT PAR	# 1	77		YES		7 72				NON NON
CCUM	I-JWD:	. 7	YES			25	76.5			Z
HAKE) 1	50 1	_		NO.N	2 0 2	-	YE S		
AE NC	# SE	51		10	~	6		>		NON
COM A F R	Ī	20		CO1 CO1		8 2	E.S.			Z
30 20 30 30 30 30 30 30 30 30 30 30 30 30 30	3	117	YES	•		5 711	YES YES			
UPEU F THE	tC I At	•			0.	916	>			N O
1 VEL.	JAME	15			NON COI	15.2				<i>z</i>
NC DI	_ 5 9 *	7	1E S		-	3				N O
HE I	(ABDE	13	YES YES			13 2				Z O
MAS ANI	1 K K K K K K K K K K K K K K K K K K K	2			NON	7 71				N N
STEN CT10 JEC1	2 A C	Ξ	re s		-	: :				2 0
IF THE SOFTWARE SYSTEM WAS HEING OFVELUPED FOR COMMENCIAL (COMPUTER) HARDWARE, WAS SELECTION AND DELIVERY OF THE COMMERCIAL MARDWARE PARTOF THE OVENALL PHOJECT? (ADDED) A. YES) 1, FUKNISHED BY USEK (ADDED) 1816M WAS NUT DEVELUPED FUR CUMMERCIAL UFF-THE-SHELF COMPUNIER 18DWARE IMMENT	108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	YES YES			208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 225 226 215 211 211 218 229 250				NDN CO1 NON NON NON NON NON
THAK HAS HALL	KN 1Si	20		YES		606	YES	YES		2
SOF WE.	NU NU, FUKN SYSTEM W HARDWAKE COMMENT	901	YES			808				100
1F THE HARDWA OF THE A. VE	N N N N N N N N N N N N N N N N N N N		-	Yts					C 0 4	J
TAF.	#U > ~	106			100	206	re s			
		105		YES		205	YES YES			
		104		TES YES		\$0.4 5.0				NON
		103			NON	× 503	YE S			
		0ND0 102			NON	00ND0				C 0 1
٥		RESPONDUR 101 102 103 104 105 106 107			COI NON NON	HESPONDOK 201 202 203 204 205 206 207			C 0 2	•
z o					-				_	
4UE ST 10N		PART/SUB	V 10	9	V 10	PART/3UB	4 :0		0 1 C	٠ •
3		PA	•	•	-	PA	•	•	,	•

eues s T on	40						HET - THE REALT IN	FF-THE-SHELF (COMPUTER) ATTON DID THE PRODUCTION HATCH REMOTE BATCH/NEMUTE JUI INTERACTIVE PROCESSING TRANSACTION PROCESSING STAND ALONE MAKDWARE UTHER	THE THE ON PA	COMP FROD CES OCES	UTFR UCTIO	D HAR DN SY GREA CREA	STEM T T T T T T T T T T T T T T T T T T T	HE-SHELF (COMPUTER) HANDWANF WAS USED, IN WHAT MODE ON DID THE PRODUCTION SYSTEM KON? (ADDED) H H HACTIVE PROCESSING (KEAL TIME) (ADDED) NSACTION PROCESSING ID ALONE EM WAS NOT DEVELOPED FOR COMMERCIAL, UFF-IME-SHELF (WARE) NAME	OSE (ADDE)	0, 1N 0f0) KJETJ 0)	INE -	I MUJ	- CG#	THE-SHELF (CUMPUTER) HARDWARF WAS USED, IN WHAT MUDE UP TO DID THE PRODUCTION SYSTEM RUN? (ADDED) THE BATCH/REMULE JUH ENTRY TERMINAL (RJET) THE BATCH/REMULE JUH ENTRY TERMINAL (RJET) THACTIVE PROCESSING (REAL TIME) (ADDED) TSACTION PROCESSING TO ALONE THE WAS NOT DEVELUPED FOR COMMERCIAL, UFF-THE-SHELF CUMPUTER THE WAS NOT DEVELUPED FOR COMMERCIAL, UFF-THE-SHELF CUMPUTER THE	_						
PART/SUB	_	HESPONDOR 101 102 103 104 105 106 107 10	03 10	4 105	2 106	107	108	109	110	=======================================	112	113 1	7	. 11	=	7 118	1119	120	121	1 221	23 1	24 17	081 951 851 751 851 851 851 551 551 151 150 150 150 118 117 111 111 111 111 111 111 111 111	121	128	126 1	130
0 1	YES	ø	76.8	99			YES				Ū	C 0 3				YE 3	YES YES YES	YES			~	YE S					rt s
9 10																					>	YES					
91 C				YES	an.	YES			C03 C03	C 0 3	Ū	CO3 YES	r S						YE S	YES YES COS	0.3	¥	YES YES				
0 10							YES								YES	20			16.5								
01 E								YES																	YES		
) Y		NON NON	NO		NON	_				_	100		Ž	NUN COI	_									C 0 1		103	
7 10																		014									
PART/SUB		RESPONDOH 201 202 203 204 205 206 207 20	03 20	4 205	5 206	207	208		210	5112	212	113 2	14 2	209 210 211 212 213 214 215 216 217 218	6 211	7 218	518	220	122	219 220 221 222 223	23 2	24 25	224 225 226 227	227	228 229 230	254.2	30
۷ 				YES	_			YES		_	YE.S							YES			>	YES YES	ø		YES	YES YES YES	11.8
9 -																C 0 3			YES		>	YES	YES				
) TO	C 0 2		£03			£03		C 0 3								C 0 3		YES	C 0 3		~	ES C	YES CO3 YES YES YES	YES	YES		
0 10																			•					YES		•	
01 E					YES										YES				Yes								
÷ •		C 0 1	NON	z			N O N		NON COI	C01	•	N N O	NO NO	NON NON NON NON	z		NON			CO3 NON	NO						

## Cive many Activity was a many about the state of the s	HESPONDON NON NON NON NON NON NON NON NON NO	UUE 9 I 1 UN	8						1 HF 1	ARGE J	3	COMME	COOL	CUM CLUM	PULL	TABLE ; CPRODUCTION) COMPUTER FOR THIS THE-SHELF COMMERCIAL SYSTEMS	H	5 50	T M A K	SOF TWARE CAPABILITY	ABIL	} -	WAS						
101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 N/S 0EL DEL DEL DEL DEL DEL DEL DEL DEL DEL D	Marie Mari							•	CENT CENT CENT CENT CENT CENT CENT CENT	MANU UPER I CO	A I I N	LK K	T T T T T T T T T T T T T T T T T T T	ENPL TAPL	CUMP	OUEL FKC 1 A	יור כסי	MPU16	r										
N/S OEL DEL	1	š/1		3PONDOX 1 102 10	2	04 105	90	2		601	1.0	Ξ	112	113	114	1 511	9	17 11	= =	4 120	171	124	123 1	24 1	25 1,	26 12	7 12	B 12'	9 130
N/S GN GP6 GP4 GN GN GN GP1 GN GP1 GP1 GP1 GP6 N/S GN GP6 GP4 GN GN GN GP1	1	۷ ــ			Z	/S 0£L		9		. OEL	DEL	DEL		DEL	130		ā	EL 0.E	L 0É	_	DEC	כמכ	St. C	n on	r F	s/			S
Mono Non Non Non Non Non Non Non Non Non	Fig. 1 Fig. 2 Fig. 3 F		~		Z	/S GM]		9		E CM	GM I	3		GP 7	- 1 5		3	- E	, 9	Ø	GM .	6 P 6) /d	2	s/			2 43
Mail	1		~					OF	_								ā	.											
N/S GOS GOS GOS GOS GOS GOS GOS GOS GOS GO	1		•					G.	~								<u> </u>	ī											
NUN NON NON NON NON NON NON NON NON NON	NON NON		_		z	/9 DEL		DE				OFL		DEL			-	Ĭ	Ď.	_) 10	SUC	St.L	0 00		8			CN
NON NON NON NON NON NON NON NON NON NO	NON NON		~		Z	/8 608	_	09	s			603		608			ÿ	SU	09	s	K S X	S Y M	N X	9 00		s/			IMS
##SPONDOR 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 18M DEL N/S ZER HCS UNI ZER HPK DEL DEL GP6 GMI GMI GMI GMI GMI GMI GMI GMI IBM DEL ZER 05M GOS GOS GOS NON NON NON NON NON NON NON NON NON N	4£3PUNDOR 1BM DEL N/3 2ER HCS 1001 213 214 215 216 216 217 216		Š	NON NO	ž		Õ	,					100			NON	10:			NON	_					ŭ) NO	N Ce1	
A1 18M DEL N/3 ZER HCS UNI ZER HPK DEL DEL DEL A3 A3 A4	A2 CPA	1/8		9PUNDUR 1 202 20	93.2	04 205	200	9 20		B 209	210	211	212	213	214	5 515	5 918	17 21	8 21	9 22(1 22 1	777	223	2 42:	Š S	5 97	22 7:	8 22	229 250
A5 GP6 GM1 GM1 GP4 GM1 GP7 GP7 GP4 GM1 GM1 GM1 GM1 AM A4 A	A2 GPA GM1 GM2	4			_	ž	3 261	2		HCS			S				7	ER	×	06.1	. 01.1		_	ור ס	Ē. 0	וו וו	Q) H	כ כחכ	כ מנ
A4 A4 GP7 B1 IBM DEL ZER HPK DEL DEL B2 05M G0S G0S B3 MON	A4 CP1 CP7 B1 CP3 CP7 B2 CP3 CP4 B2 CP4 CP4 B3 CP4 CP4 B4 CP4 NON NON NON	٧			7	3	- CP	3		EM9			CP 7				•	P 4 G	=	<u> </u>	[CM]		•	9 14	P 7 6	5 74	1 GP	6 6	9 9
A4 B1 IBM DEL ZER B2 05M G0S G0S NON NON NON NON NON NON NON NON NON NO	A4 GP1 GP7 B1 IBM DEL ZEH HPK DEL		•				H	en.		<u> </u>																			
HI IBM DEL ZER HPK DEL DEL DEL B. 05M GOS	H1 IBM DEL ZER H2 0SM GOS GOS Y CO1 NON CO1 NON CO1 NON CO1 NON NON NON NON NON NON NON NON NON N		7				E.	_		GP 7																			
B2 05M 603 605 605	BZ OSM GOS GOS Y CO1 NON CO4 NON NON CO1 NON NON NON NON NON NON NON NON NON N				4		7F	2									7	EK H	¥	0F1	. Of L		_	בר ו	a H	11	9M C0	ר כח	ر ر
NON	T CO1 NUN CO4 NUN NUN CO1 NUN NUN NUN NUN NUN NUN				80		09	ø									×	Σ Σ	<u> </u>	09	S09 8		Ū	s sos	9 503	S 80)S S/	λε . Ο	S SC
ACM NOW				103	Z	Z S		ວ		z	NON	C 0 1		N O N	NON	NON	NON		N	z		S	NON						

	1 50	T T	675	E	DVS		230	כחכ	CP5			CUC	900	
	129					00	524	ეიე	6P 6			CDC	SYS	
	108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130					C 0 4	228	202	GP7 GP7 GP7 GP6 GP6 GP5			DEL INH DEL 18M CUC CDC CUC	COS SUS COS SVS SCO SYS SCO	
	127					100	227	EM	GP 7			161	S V S	
	126	N/8	N/S	S/N	N/8		226 227	UŁL	6 1 7			DEL	60s	
	125	HIS COC SEL COC DEL	GP6 GP6 GM1 GP7 GP7 N/S	DEL N/S	60S N/8		225	DEL DEL DEL 18M	647			Ĭ	808	
	124	202	GP 7				224	130	697			OEL	509	
ภู	123	138	GM I	Stl	Ξ		223							C02
÷	122	CDC	GP6	Suc	GCO SYM RIM		222							NUN COZ
1111	121	<u>ه</u>	6 P	HIS SUC	039		221	DEL	GMI			DEL	603	
HOST (DEVELUPMENT) COMPUTER FOR THIS SUFTWARE CAPABILITY WAS THE-SHELF COMMERCIAL SYSTEM; E MANUFACTUKEN, MARE AND MODEL E WANUFACTUKEN, MARE AND MODEL E OPERATING SYSTEM EMPLOYED T COMPUTER WAS NOT A COMMERCIAL COMPUTER	120					NON	220 221 222 223 224 225	DEL	CH I			DEL DEL	s09 s09	
بر بر	5 -	DEL	8/8	IBM	:0°		219							£00
7 X	118	DEL VËL DEL	GMI GP6 N/8				218	8 / R	CM I			Į X	HIE	
s su Fute	117	DEL	GM I				217	2 F H	6 P 4			ZER HPK	HPM HTE	
1H1 COM	911					103	216						_	Z O
FUR PEL CIAL	115					C04 C01	515							NO
SYSTEM: SYSTEM: AND MODEL IPLOYED COMMERCIA	7.1	ot t	1 M 9				214							NON
. MOST (DEVELUPMENT) COMPUTER FUR THIS SUP- -INE-SHELF COMMERCIAL SYSTEMS VE MANUFACTURER, MANE AND MODEL IVE UPERATING SYSTEM EMPLOYED INT COMPUTER WAS NUT A COMMERCIAL COMPUTER UMMENT	5 =	חדר	GP 7	730	205		212 213 214 215 216 217							NON NON NON NON
MOST (DEVELUPMENT) CO *IME*SHELF COMMERCIAL VE MANUFACTUMEN, MAKE VE UPERATING SYSTEM EM IST COMPUTER WAS NUT A IMMENT	112	_	Ī		•	C 0 1	213	I NO	GP 7					•
UPME DMME DMME NEK, SYS NAS	=	DF L	GM I	DEL	c03		211	-	J					100
ACTURE COLUMN TING	011	DEL .	GMI	_			9 2							C04 C04
HOST (DEVE THE-SHELF VE MANUFACI VE UPERATIN ST COMPUTER	109	DEL DEL	CM I				209 210	HC 8	E H 3	I RM	GP 7			
CFF-IHE-S CIVE MAN GIVE OPE GIVE OPE HUST COM	108		_			NON	208							N C
##22242		130	GP 7	DEL	809	_								700
2	106	_	_			P00	306	7£ K	200	HC S	EM I	ZEK	809	
	105	DF.L	GM I	DEL	809		505	8/N	6M1 6P4	-			•	
	104	IBM DEL	GP4 GMI	IBM DEL	DVS GOS		504	-	Ū					N C S
	¥ 0 7				_	NO.	£ 03	130	GM 1			DEL	809	_
	102 N					N S	100NL	_	•			_	Ū	C 0 1
→	KESPUNDON 101 102 103 104 105 106 107					NON NON NON	RESPUNDON 201 202 203 204 205 206 207	¥ 9	6P 6			H91	110	_
Z O		44	~		~					**	3 7			
uuk ST 10N	PART/SUB	7 TO	01 A2	01 81	01 82	A 10	PANT/3UB	14 10	01 A2	01 43	01 A4	19 10	01 82	>
ž	PAS	-	-	-	-	•	4	_	-	-	•		_	•

	0.5			NON	80			Š
	1 52	S		z	5 67			Z -
	1 82	res res			2 82) #O
	27 1	>	200		5 15			NON NON COI COI CO4 COI NON
	76 1	YE 3	د		7 97 7) IO
	52	>		010	2 52			ON
	1 77			NUN COI	2 4 2			Z C
	23 1	YES		Z	2 8 2	Yt s		Z
**	7 1	>		NCN	2 22	YES Y		
IF THE SOFTWARE SYSTEM WAS DEVELUPED FOR SPECIAL PURPOSE HARDWARE, WAS THE HARDWARE DEVELUPMENT PART OF THE OVERALL PROJECT? A. YES B. NO Y. SYSTEM WAS NOT DEVELUPED FOR SPECIAL PURPUSE HARDWARE,	109 110 111 112 113 114 115 116 117 118 119 120 121 123 124 125 126 127 128 129 130	20		z	209 210 211 215 215 214 215 219 219 220 221 222 223 224 225 215 214 215 215 215 219 259	>		10
# # # # # # # # # # # # # # # # # # #	50 1	YES YES			20 Z			NON COI
NPOS OJEC NDWA	2	>		10	19.2	YES		Ž
OFTWARE SYSTEM WAS DEVELOPED FOR SPECIAL PURPOSE H HARDWARE DEVELSPMENT PART OF THE OVEHALL PROJECT? EM WAS NOT DEVELOPED FOR SPECIAL PURPOSE HARDWARF.	91			NON CO1 CO1	18 2	Ĕ	YES	
FCIA ERAL KPUS	1 11			ON C	17 2		-	NON
ר הא יי טעי	9	S		Ž	16 2	S		ž
0 F0 F TH ECIA	15 1	YES YES YES			15 2	YES YES YES		
RI OF	2	ES Y			14 2	F. 8.3		
D FO	1 5 1	>		N C N	5 5	YES YI		
WAS PMEN LUPE	1 21	YES		ž	2 2	Ξ		-
TEM VELS DEVE		YES Y			2 =	YES		C01
SYS E DE NOT	1 0 1	¥		-	2 01	£ 8		
WARE DWAR HAS	1 50			NON CO	5 60	YES YES		
THE SOFTW THE HAND YES NO SYSTEM W CUMMENTS	90							
THE STAFE NO SYST COMM	11 /0			NON NON)2 70	C03 C04		
A Z	RESPONDOR 101 102 103 164 105 106 107 108	YES		ž	RESPONDOR 201 202 203 204 205 206 207 208	3		=
	35 10	¥		z)s	93		001
	7			NON NON) *	YES YES		
	03 10		YES	ž)3 Z(7		C 0 4
	NDOR 02 1	YES	Ξ		400R		øg.	ວິ
	RESPONDOR 101 102 10	=	YES		RESPONDOR 201 202 2		YES YES	
2			×				7	
4UE ST 1 ON	PAHT/SUB	V 10	0 1 B	-	PAR1/SUB	V 10	2	>
300	7	•	ō	6	PAR	õ	0	6

	18 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 121 128 129 130				NON		209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230				NUN NON COI COI CO4 COI NON	
	571.5	_				E	5 22 8				60	
	126	C 04					224				000	
	151	YES YES					122				C0	
	126	YES	YES	YES			- 226				C 0 0	
	125				NON COL		555				NON	
	124				NON		224				NO.	
ಕ	123		C 0 2				223	Yt S	Yt S	Yt S		UTH OTH
NAKE UNIK	122				NON		222	rt s	Yt S	rt s		E
HAKDI ND CO	121		YES YES				122				NUN COL	
UD ALL	120	YES	YES			01н	220				S	
UKPL DMMAR IESS (ARD)	671				103		219		YES			
HE SOFTWARE SYSTEM WAS DEVELOPED FOR SPECIAL PURPUSE HAKDWARE TYPE WAS THIS? EMBEDDED CENTRAL PHOCESSOR SPECIAL TERMINALS SUCH AS THOSE EMPLOYED IN COMMAND AND CONTROL SPECIAL TERMINALS SUCH AS THOSE EMPLOYED IN COMMAND AND CONTROL SPECIAL SYSTEMS SUCH AS RADAR SENSORS, ON PROCESS CONTROL DEVICES, THAINERS, FTC. SYSTEM WAS NOT DEVELUPED FOR SPECIAL PURPUSE HARDWARE UTHER	118				100 100		218					01н
. ED 1	117	C 0 2		203			717				NON	
OH S OHS,	911	YES					216	Yt. S		YES		
ED F E EM SENS	115	YES COZ YES COZ					215	TES YES		TES YES YES YES		
ELOP THUS DAK OK S	3	YŁ S					214	YE S		YE S		
LE MAS INIS? DUED CENTRAL PHUCESSUR THAN THE PHUCESSUR THAN TERMINALS SUCH AS AIRBORNE SYSTEMS, ETC. EES, THAINERS, ETC. EE WAS NOT DEVELUPED F	= 3				NON		213	YES YES		YES		
LE MAS IMISS DUED CENTHAL PHOCES DUED CENTHAL PHOCES TAL TERMINALS SUCH AIRBORNE SYSTEMS, E TAL SYSTEMS SUCH AS TAL SYSTEMS LECES, THAINERS, ETC. EM MAS NOT DEVELUPEL	711			YES			212				NON	
STEM 7 ALS ALS YSTE S SU ERS, OEV	=			YES YES			211		YE 3			
E STER STER STER STER STER STER STER STE	0				100		210	rt 3				
LE MAS THIS? DUED CENTMAL THE TERMINAL AIRBORNE SYSTEMS TAL SYSTEMS CES, THAINEL	÷01				NON		502	YES YES				
SCHANNER SCH	80				NON			C 04	100	700		
HAT TAPE B. BABE B. BABE C. SPEC C.	201				NON NON		202	Ū	YES CO4	YES CO		
2	90	Yt S					90			_	100	
	501				NO		5 50			Y E 9		
	0.4				NON NON		904	YES	YES	_		
	0.5		YES		Z		2 50	>-	-		C 0 1	
	N008	YES	YES Y	YES			NDOR 02 2	Yt S	8	£ s	Ų	
=	HESPONDON 101 102 104 105 106 107 10	~	~	~	NON		RESPONDOR 201 202 203 204 205 206 207 208	>-	YES YES	YES YES		
= =					Z				>	-		
QUE S T 1 ON	PART/SUB	A 10	9 1	J 10		7 10	PART/SUB	۰ ۱ 0	0 10	0 10	V 10	7 10
300	PAH	•	•	•	•	-	FAR	-	•	•	•	•

uut s f I on	NO.	12				DEVELOPING THIS SPECIAL PURPOSE CAPABLLI	10t v	ELOP TH1S	MENT) SPEC	COMM	E RC 1	AL HA	RUWAH PAHIC	1 27.1	SYSTEM MAS USED YI	MAS U	SED								
				**************************************		GIVE MANUFALIUNEN, MARK, AND MUNEL GIVE UPERATING SYSTEM EMPLOYED SYSTEM WAS DEVELUPED UN SPECIAL PUMPUSE COMPUTER SYSTEM WAS NUT DEVELUPED FOR SPECIAL PURPUSE HAR	PER	11.NG	SYST	LLIONER, MAKE, AND MODEL ING SYSTEM EMPLOYED DEVELUPED ON SPECIAL PUMPOSE COMPUTER NOT DEVELOPED FOR SPECIAL PUMPOSE MAKOWAME (ADDED)	SPECY	SPFC	UMPUS 1AL P	r cor	4PUTE St. HA	7 Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y	E (A)	01.03							
PAR1/SUB	SUB	RESPONDOR 101 102 103 104 105 106 107	103 104 1	105 106	107		601	110	111	108 109 110 111 112 113 114 115 116 117 118 119 120 121 124 125 124 125 127 128 129 130	3 110	115	116	1117	118 1	21 61	151 0	124	123 1	24 12	5 126	127	126	1 671	30
4 10	7			0Тн	_				3	DEL		200	כמכ חנר									COC	CDC IBM		
4 10	A2			I WS					9	I M S		6 P 7	697									6 P J	6.66		
V 10	A 3								۵	DEL			140												
•	*								و	EM I			6P 7												
H .	 2								2	130		CDC										ეიე			
10	82								•	603		900										NOS			
9 10	63								2	Utc															
9 10	4 4								ون	603															
010	u	YES YES	re s								YES					YES	m				YES	_	_	107	
0 1 V	_		C01 C01	101	00	C 0 1	C 0 3	100	604	70 C	7			C01 C02		C 0 1	C 0 1	107	CO1 CO1 CO4 CO4	04 CO2	A)			z	NON
2 10	2	01н																							
PAKT/SUB	808	MESPONDUR 201 202 203 204		205 206	207	208		209 210 211	2112	212 21	213 214 215	215	216	217	218 2	219 22	122 0	222	750 251 255 254 255 256 256 755 755 755 755 755 755 755 755 755 7	24 22	5 226	227	228 4	629 230	30
4 10	V	GPb	Ε.	8/2	184		HC 8	200	181																
4 50	42	CP 7	3	CM 3	GP 7		EMI	GP 5 (697																
4 10	A 3	DEL					E Z																		
0 1 A	# 4						GP7																		
9 10	.				H	_							,	_											
5	82				808																				
3 10	۲,		YES			03				YE	YES YES YES YES	YES	YES		YES Y	YES		X I S	YES YES C	700 t					
V 10	_) 100	103	100					Ü	£0.7				103		C 0 4	100 #			ŝ	1 001	100	CO1 CO1 CO1 CO4 CO1 CO1) 10:	0.0

	2		rt s	9		YE S
	081 6		YES YE	224 250	ະກ	¥
	8 12	တ	7.	8 22	SYES	
	7 12	YES	70	1 22	YES	•
	2		YES YES	55.		YES
	72.1		76.5	526		71.5
	125	YES		225		YES
	124	YŁ S		724		YES
	123	¥ t s		225	Yt s	
53	421 821 721 821 821 821 821 821 120 121 116 117 118 117 118 117 118 118 118 118 118	YES YES YES YES YES		209 210 211 212 213 214 215 216 217 218 219 220 221 225 224 225 226 226 227 228		11.5
USE	171	765		122	YES	
# F	120	YES		220		Yt S
CUSTOMEN PUNCHASING THE SOFTWARE SYSTEM FON OTHEN USEKS? Ent	5		YES	219	YES	
2	2		rt s	216		rt S
3 5 2	117		. S	11.		r s
ج ب	•		YES YES YES YES YES COS COL YES YES	91		YES YES YES YES
T T	15.1		0 \$ 0	5.2		F S →
sos	1 4		t S C	14 2		YES Y
13.	13 1		E S	13 2	YES	>
9 I N C	1 21		-	2	YES YE	
CHA	= =		∓ 9	7	7	3
5	-		S YE	12 0		YFS CO4
UME	=		S YE	4 21	93	X
CUST ENT	9	æ	≺ E	50	STES	
MAS THE CUST A. YES B. NO Z. CUMMENT	9 -	7	6	507	YES	
S	2		YES YES	207		YES YES
1414	106		YES	206		YE S
	105	YES		202	Y & 3	
	0 -		YES	204		Y E 3
	3K 103	res res		203	YES YES	
	RESPUNDOR 101 102 1	YES		202	YE S	
•	RE SF 101		YES	HESPONDON 201 202 203 204 205 206 207 208		YES
N .	ans,	•	22	SUB	<	2
40E ST I GN 14	HESPUNDON PANT/SUB 101 102 103 104 105 106 107 108	4 10		PART/SUB	4 10	5

	108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	YES	YES YES YES	208 7'7 210 211 212 213 214 215 216 219 219 220 221 222 223 224 225 215 214 215 217 218 229	YES YES YES	YES
	25 126	YES	YES	55 226		YES YES
	24 12	Ξ	YES	54 5	E S	=
	123 1	Yt S	>	223.2	rts y	
	124		¥£ 5	222	C 0 3	
	121	YES		221	VES YES YES COS YES YES	
	120		Yt s	220	YES	
_	8 118		3 YE S	915	YES	
DDED	7 116		3 YE !	7 216	YES	s
5	9 11		0 D #1	6 21		YES YES
(1S) THERE; MULTIPLE USERS OF THE SYSTEM UNLY UNE USER (UNE ON MORE LUCATIONS) (ADDED) COMMENT	15 11		COS YES YES YES COS CO4 CO3 YES YES YES	15 21		ES YE
FOCA H	1 7 1		LS C	2 4 2		TES TES
SYSTE Muke	113 1		rt s v	213 2		YES Y
1 3 2 3	112		YES	212	YES	_
S OF CONE	111		YES	211	CO3 YES	
E B USER USER	110		C 0 3	210		¥
THER IPLE ONE NI	601 1	YES YES		i.		Y£ 9
(1S) HULTI UNLY COMME					YES	va.
AKE A	01 4	YES	vs	0 5 0		S YE
	05 10	YES	YES	05 20		SYE
	KESPONDOR 101 102 103 104 105 106 107	¥	C 0 4	RESPONDUR 201 202 203 204 205 206 207		YES YES YES YES
	103	14.8	J	103 2	YŁ S	>
	KE SPONDOR 101 102 10	TES TES		RESPONDOR 201 202 20	_	YES
	RE SP 101		YE.9		YES	-
<u>"</u>						
0063110N 15	PART/SUB	4 I 0	8 10	PART/SUB	0 1 A	9

UNDER WHICH OF THE FOLLOWING CONTRACT TYPES OR AGREEMENTS WAS THE SOFTWARE SYSTEM DEVLLOPED? (AFPR, 1976) A. FIRM FIXED PRICE B. FIXED PRICE WITH ECONOMIC PRICE ADJUSTMENT C. FIXED PRICE WITH ECONOMIC PRICE ADJUSTMENT C. FIXED PRICE LEVEL OF EFFORT F. COST SHARING G. COST PLUS TAKED FEE J. TIME AND MATERIALS H. COST PLUS FIXED FEE J. TIME AND MATERIALS H. LABORH-HOUN L. BASIC ORDERING AGREEMENT Y. NO CONTRACT WAS USED (ADDED) Z. OTHER	105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 123 124 125 126 127 128 129 130	YES		VES YES YES	YES	CO3 YES	003	YES YES YES	res			
2 × C C C C C C C C C C C C C C C C C C	RESPUNDOR 101 102 103 104 105 106 107 168 109 1	YES					76.9	YES YES	غف	YES		
50 T T T T T T T T T T T T T T T T T T T	RESIPARIZEUB 101	٠ ١٥	9 10	91 E	01 F	9 10	н 10	01 I YES	F 10	01 6	× 10	01 Y

01 C vés			YES YES YES YES YES YES	YES YES
----------	--	--	-------------------------	------------

3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	I LAALI
MHAT WAS THE TOTAL COST OF THE PROJECT IN THE CHISTOMERS	AMBUNI NOT AVAILABLE, PLEASE GIVE A MANGE ON EXPLAIN
UUESTION 18	

HOW MUCH OF THE TUTAL COST (ESTIMATED) WAS ATTRIBUTABLE TO THE	PHUDUCTION OF SOFIWARE, INCLUDING MACHINE TIME, PRUGRAMMER SALARY,	(MANAGEMEN) OF SUFINARE DEVELOPMENT, OVENHEAD RELATED TO SUFIWARE)	AND OTHER ADP OPENATING EXPENSES? (ADDED)	•
UUE ST 1 0 N 1 9				

	108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 13	00 100	10 190	00 110	064 07	224 236	010 000	074 07	005 01	076 07	
	8 12	00 1	5 06	6 01						0 9	
	1 12	100 9	5 0 75	9009	4 07	7 22	9 00 A	4 074	010 100	010 1	
	12	ě.	0.1	900	0.07	25	900	074	00	077	
	120	9	67	900	0 8 (220					S E
	\$2	700	072	90.0	075	552	900	075	900	076 078	
	124	003	072	700	074	224	900	072	900	076	
	123	900	075	012	076	223	900	073	000	075	
•	123	900	075	012	070	222	003	076 076 074 073	900	910	
•	151	900	075	00	078	221	600	076	010	077	
•	120	900	510	900	610	220	001	076	012	210 310 110 110 110	
<u> </u>	=======================================	007	076	100	077	519	900	075	011	017	
FF.	118	100	072	012 007 006 005 012 012 002 006	67.0	218	900	010	900	972	
) (G	1117	100	074	900	075	217	004	071 070 075	012	073	
PRUJECT BEGAN (FIRST ASSIGNMENT) IN************************************	9 .	900 900 700 800 900 900 900 900 100 100 900 900	071 076 076 072 073 074 069 074 072 076 072 075 075 075 072 072 074 072	001 000 000 000 000	014 018 019 019 016 016 013 015 012 011 019 018 016 016 019 015 080 014 018	210 211 212 214 215 214 215 216 219 220 221 222 222 224 215 216 217 218 219 228	007 002 001 006 004 006 008 001 009 003 006 006 006	690 510	005 006 012 006 011 012 010 006 004 006 006	017 077 073 072	
END)	115	900	074	00	076	215	100	075	500	077	
COME TEA	114	900	073	900	076	214	200	910	004 003	077 078	
ASSI ON .	113	003 000	67.0	100	610	213	007	073	000	077	
1831 (40)	711	600	076	900	610	212					SIE
E NO	=======================================	900	076	005	078	211	003	073	003	080	
AND	110	900		900	074	210	008 003	075	011	077	
1 (3 K)	104	001	072 074	3) Z	075 1NF	504	008 003	075	010	076	
Y X	104	900	510	500	075	208	900	077	003	990	
TH1S P	101	002	076	600	077	207	900	073	990	075	
==:	106	900	919	110	077	206	900	071	007	075	
	KESPONDOR 101 102 103 104 105 106 101	009 001 007 006 002	070 072 075 076 076 075 076	004 006 006 012 007 011 009	170 170 170 870 170 810	KESPONDOR 201 202 203 204 205 206 207	000 000 000 010 001 000 000	073 068 071 073	009 006 009 007 006 007 066	073 083 076 083 071 075 075	
	104	001	076	710	078	204	010	073	000	083	
	103	600	075	900	110	203	600	074	600	076	
	KESPONDOR 101 102 1	210 100	072	900	910	KESPONDOR 201 202 2	900	190	900	083	
0.2	HE SP 101	100	010	700	073	KE SP 201	600	071 067	600	073	
8	97		_		_	90		_		_	
4UE ST 10N	PART/SUB	0 T	9) IO	0	PART/SUB	0 1 A	9) IO	0 10	×
3	A					ď					

	90			0 0 1						30			100			
	109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130			-	100					052 852 852 755 855 855 455 858		100	-			
	1 93		060		_	010				88	•	=		9		
	7		0		0	ō				7 22	090		s	5 040		
	9	0			100	0				77 9	•		960	900 010		
	5 22	020				080	•			25 .5	060 2					
	2	_			_		100			25	200			860 510		
	15,	060			040 010					554	085			015		
Ž.	121	090			040					223					100	
HAN UNK	122		100							275		100				
•	171	100			660 570					220 221	070			0 8 0		
NIA MUNICIPAL NA MARKAN NA	120	075			970					220	060			010		
HANNINK NO.	2	100								219	010			060		
ANGUAGE WAS THIS DATA SYSTEM PHUGHAMMED? IF MUNICALE SANDED FLEASE INDICATE APPHUPKIATE PENCENTAGES AN HOLDED SANDED SAN	91	010 100 100								218	010			100 100 100 100 100 030 060 010		
KAMM RTE	111	010			060					217	-			06		
жи рки ки	9				060 010 001			060		9				00		
HA DOA	15.1				0 00			•		15 2				1 00		
SYST IE A DED)	-	100			-					14.2				00		
HAT LANGUAGE MAS THIS DATA SYSTEM PRUGHAMMEUT UAGE WAS USED FLEASE INDICATE APPRUPRIATE PER FORTHAN JOVIAL ASSEMBLER (UNSPECIFIED) (AUDED) ASSEMBLER (UNSPECIFIED) (AUDED) FFFF CMS-2 (ADDED) HIGHER URDER LANGUAGE (UNSPEC) (ADDED) FFFFF UTHER	13.1	1 50			95					212 213 214 215 216				00		
15 D 16 D 16 C	1 21	560 010			900 060 000					~	560			=		
CIF	=	0 0 90			0						0			•		•
WASPE	=	9			70					0 211				0 030		070
LANGUAGE WAS USEU RAN AL AL (ADDED) EM ONDER	= -	•			0 1 0 0					209 210				100 100		
RE CAN	9 10	090		•	0 040					5 20	_			0		
THAI CONTENT COB				060	010					206	080			050		
2 2 2 4 • • • • • • • • •	10	100								207				100		
-14800465W	100				100 100					204 205 206 207 208	015			085		
	105				100					205				100		
	701			100						204				030		070
	103		075		570					¥ 0.7	0 0			060		
	0N0C 102					100				OND 202	080			050		
2	KESPONDON 101 102 103 104 105 106 107 10					000 100			010	HESPONDUH 201 202 2	080 080			020 020 090 030 100 085 100 020		
						-			*		-			-		
CUE S I I ON	PAH I / SUB	0 T	# 10	0 C	3 10	01 E	91 6	0 1 6	7 10	PAR1/SUB	V 10	9 10) 10	0 10	01 E	9
3	Ž	J	•	3	•	•		,	3	PAR	9	J	-	9	3	9

	KESPONDOR 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 12P 130	102 453 183	102 702	751		209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230	204 653 704	15.5	205	
	127 1	7 707 1	801			2 227 2	253		203	
	125 120	104 264				552 556	04 100	104 305	503	
	124	105	501 107	21		\$ 224	1 254			
WHI FIEN?	122 12:	104 504	07	30 2		255 253	15 402	184	345	
	121 0	1 504		204		0 221	707 7	203 501 184	~	
, APPHUXIMAIELY HUM MANY LINES OF SOUKCE CODE MEHE UTABLE ENIS H NON-EXECUTABLE	114 12	603 501 502 303 504 104 504 105 104 264 402 202	105	105		219 22	802 203 143 504 503 144 402 704 513 254 504 104	114 20	103	
OUKCE	17 118	03 501	103 500	303 500		17 218	43 504			
rs of	5 116 1				SIN	5 216 2	2 203 1	102 201	102 153	
N L	114 11	603 563 573 502 125 103 153	155	709		214 21	303 808	01	01	
MON MON	12 113	251 50				12 213	403	302		RIS
MATELY CUTABL	-	573 5	603	502 103		2111	304		202 104	1
OTAL, APPHUXIMATELY EXECUTABLE COMMENTS OTHER NON-EXECUTABLE	104 110	505 563	104	205		209 210	413 402	202	202	
OTAL, APPH EXECUTABLE COMMENIS OTHER NON-	1 108 7	3 425 6		2 235				~	~	
IN 101AL A. EXEC B. COMM C. UTHE	106 10	602 20	103 302 502	502 202 503 23		206 20	203 16	123	103 202	
	4 105	3 103	103	205		4 205	4 303	3 202		
	DH 103 10	304 85	303			38 203 20	503 10	963 503 202	505	
2	HESPONDOR 101 102 10	203 154 304 853 103 602 203 425	103 503 303	503		RESPONDOR 201 202 203 204 205 206 207 208	503 304 503 104 303 203 163 633	503	203	
110N 22			20	U	×		<	3 2	~	×
QUE STION	PART/SUB	V 10	6	-	10	PART/SUB	5	10	0	10

UUEST10N 23	OSING	TABLE	1 ON THE	FOLLUMING PAGE	USING TABLE 1 ON THE FULLUMING PAGE PLEASE ESTIMATE THE COMPLEXITY
	OF 1HE	DATA	SYSTEM (FRUM 12 TU 601.	OF THE DATA SYSTEM (FRUM 12 TO 60). ALL DESCHIPTIONS PERIAIN TO
	COLT NA	400	77.	CHARLES ALLY CARREST	COLTRADE AND COLOR COMMON CONTRACTOR

1 30	ħ Z 0	6 5 0	041
129	054	8	5 7 0
128	036	2 828 7	
121		27.5	042 045
20	044 058	226 227	040
52	777	5 52	9 9 7
109 110 111 112 115 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128	046 055 043 657 049 049	216 21/ 218 219 220 221 225 225 215 215	044 041 048
123	150	22.5	770
125	5 + 0	777	910
121	653	521	
120	940	220	056 028
2 -	047 020 060	419	970
118	0 7 0	218	045
1117	047	217	643
116	9 70	216	041 043 042
115	900 100	215	MIS 045 047 039
7	050	717	647
115	050 050	209 210 211 212 213 214 215	045
112	039 041 040	212	S E
=	041	112	039
110	680	210	0 Z B
601	046	209	046 028
# O #	950		670
107	040	201	020
106	710	206	970
901	050	502	0 4 1
104	0 4 8	204	045
103	041	% 203	045
101 102 10	049	RESPONDOR 201 202 2	050
	01 001 053 049 041 048 050 014 040	HESPONDON 201 202 203 204 205 206 207 208	01 001 039 050 045 045 041 048 050
PART/SUB	00	JAKT/SUB	001
PART	•	PART.	0

	150	507	250	MIS 502 404 MIS 105 103 104 N/A 505 104 203 603 404 504 502 106 INF MIS 507 MIS 246 305
	,71	¥	528	246
	128	909	\$28	S
	127	305	427	507
	1 26	S E	226	S I
	125	508	225	ž
	124	505	224	106
_	123	407	223	302
APPROXIMATELY HOW LARGE A DATA BASE WAS INE SYSTEM DESTGNED FUHI (fill in blank with number of Bytes of Data)+++++++++++++++++++++	771	805	209 216 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229	204
APPROXIMATELY HOW LARGE A DATA BASE WAS THE SYSTEM DESTGNED FUNI (fill in blank with number of dytes of data)+++++++++++++++++++++++++++++++++++	171	108	221	404
EN CN	120	205	220	603
1 DE 5	=	707	612	203
S1E	==	104	218	104
A) + +	117	303	217	503
S THU	110	¥ \	216	W / W
A TO	115	202	215	104
BAS BY TE	=	S I W	3.2	103
DATA UF	113	304	213	105
E A MBER	112	103	212	4 I S
N N N	Ξ	503	, 112	104
I I	9 =	103	013	205
ELY	601	901	608	2 5
¥ Z	90	501	908	105
, KO X	6	903	. 70	<u> </u>
¥ 5	901	203	902	46
	501	981	505	٧/
	3	20	40	105
	- FO	1 500	203	103 1
	NDOK 02 1	4 40	NDOH	×
*	RESPONDOR 101 102 10	205 1	NESPONDON 201 202 203 204 205 206 207 208	104 0
GUE STION 24	RESPONDOR PANT/SUB 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129	01 001 205 104 605 107 188 202 306 105 108 403 503 103 304 MIS 202 N/A 303 104 404 203 108 805 405 506 MIS 305 602 MIS 205	PARTZSUB	01 001 104 UNK 803 305 N/A 246 N/A 105
	PAR	õ	PARI	•

	1 50			rts		230	rt s		
	\$2	YES				628		YES	r s
	108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	-		YES		210 211 212 213 214 215 216 217 218 219 220 224 225 224 225 214 215 216 217 218 229		-	YES YES
	121		Yt s			123		rf S	
	7 9 7	E S				97		1.8	
	25 1	YES YES	Yt S			5 5 5		YES YES YES	
	24 1	~	_	03	£ 0 3	24.2	Yt S	>	
_	23 1		Y t. 9	03 C	u	2 23	>		YES
PARED THE REDUINEMENT SPECIFICATIONS? CUSTOMEN UNGANIZATION AFTILIATED WITH THE CUSTOMEN, BUT NOT THE TOMEN HIMSELF R ORGANIZATION, E.G., A TWO-STEP PROCUREMENT, AN UNSOLICITED POSAL, ETC. UNISTDE CONSULTING FIRM HIMD CONTRACTOR, E.G., AN INTEGRATING CONTRACTOR E PREPARED (ADDED)	22 1	Yt S	>	YES CO3 CO3		2 22		(03	YES Y
0 H	21 1	>	YES	>		21.2	YES	ر	>
1 10 SWO	20 1		>	8		2 0 Z	>		r S
uf n , an	1 61			ES Y		19 2			YES YES
PARED THE REQUIREMENT SPECIFICATIONS? CUSTOMEN UNCANIZATION AFFILIATED WITH THE CUSTOMEK, BUT NOT THE STONER HIMSELF IN ORGANIZATION, E.G., A TWO-STEP PROCUREMENT, AN UNSUL POSAL, ETC. UNTSIDE CONSULTING FIRM HIMD CUNTRACTOR, E.G., AN INTEGRATING CUNTRACTOR IE PREPARED (ADDED)	181			YES YES YES YES YES YES YES YES YES		18 2	Y E 3		F
7 10ME CURE 6 CO	17 1			ES		17 2	F		S
PARED THE REQUIREMENT SPECIFICATIONS? CUSTOMER ORGANIZATION AFTILIATED WITH THE CUST TOMER HIMSELF R ORGANIZATION, E.G., A TWO-STEP PROC POSAL, ETC. UNISTDE CONSULTING FIRM HIRD CUNTRACTOR, E.G., AN INTEGRATING E PREPARED (ADDED)	1 9 1			ES YI		2 91			YES YES YES COS YES
ICAT THE STEP TEGR	1 51			8.3		IS 2			S 5
MITH TO THE	= =			. s		~			<u>بر</u>
E S P S P S P S P S P S P S P S P S P S	=======================================			SYE					S
MEN 1	7 11			SYE		2 21	~		YE
N, E	= -	ø		YE		1 21	C 0 3	ø	_
KEU 10N 10N AT30 C. 0NSU RAC1		rts res				0 21	တ	YES	00
PHEPARED THE REQUIREMENTS THE CUSTOMEN AN URGANIZATION AFFILIATED CUSTOMEN HIMSELF TOUN URGANIZATION, E.G., A PROPOSAL, ETC. AN OUTSTDE CONSULTING FIRM A IMIKO CONTRACTOR, E.G., NUME PREPARED (ADDED) OTHER	= -	Ϋ́			s	9 21	YE 9		တ
AKED CUSI CHEN CHEN CHEN CHEN KED KED	9 10			za.	YES	208 209			O3 YES
PHEPAN THE CU AN CHE YOUR C PROPOS AN CUI NUNE F				3 763			•		J
E E	01			y E		50,	YE 9		VES VES
	100			YES		\$0. 20.			YES
	501 1			YES YES YES YES		502		YES	_
	10			YES		204			C 0 3
	KESPUNDUR 101 102 103 104 105 106 107		YES YES			KESPONDOR 201 202 203 204 205 206 207	YES		
	HESPUNDUR 101 102 1		YES			KESPUNDOR 201 202 20			YES YES
\$2	HE 8				YES	HE 9 201			YES
N 0	SUB	<	40	J		SUB	•	20	u
BUE S T 1 DN	PAHT/3UB	5	5	5	5	PAHT/SUB	70	5	5
3	2					ه م			

20 4 2 0 X 1	HESPONDOR TO HOU CUSTOMER MAS SOUNCE (ADDED) TO HOU CUSTOMER MAS	105 7 7	A. A. C.	A. TES E. NO (CUS T. NOT APP Z. COMMENT S. YES COZ	CUSTO CUSTO APPLI TENT 16 109	OMER ICABI 9 110	ABLE, Y	SOUNCE BURGOOUR COUR YES	CUSTOMER DID NOT PARTICIPAT CUSTUMER WAS SOUNCE (ADDED) APPLICABLE, YOUR ORGANIZATI ENT 18 109 110 111 112 113 114 1 YES YES YES Z CO1 CO1 CO1	C1PA D0ED 12AT 114 YES	CUSTOMER DID NOT PARTICIPATE) (ADDED) CUSTUMER WAS SOUNCE (ADDED) APPLICABLE, YOUR ORGANIZATION DID NOT PREPARE SPECS (ADDED) TENT YES	CAUDE NO DEED NO TES TES TO TES TO TES	ED) HOT PREP	EPARE 6 119 8 YES	SPEI S 120	151 (151 AES	ADDE (125 124 725 745	124 VF 5	125 126	26 127 YES	7 128 YES	4 9	:8 129 S
01 Y C01 NESP PART/SUB 201	COI CO2 CO2 HESPONDOR 201 202 203 204 205 206 207 208	2 502	ž 90:	07 20		9 216	112	212	213	214	15 2	7 91	7 21	8 219	7 220	221	222	223	224 ;	25 25		5e 22	45 755 AS	209 210 211 212 213 214 215 216 217 218 219 220 221 223 223 224 225 226 227 228 229
01 A YES YES 01 B	YES YES	>	YES	76	YES YES	ø	YES		YES	YES	YES YES	8.3 YES	တ	7E S	YES YES		YES YES	YES					Y£ 3	YES YES YES
01 C	C 0 4		¥	YES		76.8		YES					YES	Ø		YES			YE S					
01 Y		NON														·			•	NON NON	=	ON P	NON	NON

RESTION 27 UN A SCALE OF 1 TO 7, WITH 1 HEING CLITLE MONE THAN THE NAME OF THE SYSTEM, AND 7 HEING COMPLETE SPECIFICATIONS DUWN INHOUGH PRELIMINARY DESIGN, HOW DETAILED WERE THE SPECIFICATIONS PHOVIDED? HESPONDON NESPONDON NES
UN A SCALE UF 1 TO SYSTEM, AND 7 HELI DESIGN, HUN DETALL 106 107 108 109 110 007 002 007 007 004 206 207 208 209 210
UUESTION 27 SYSTEM, AN BESPONDUR HESPONDUR 61 601 005 007 005 002 005 007 002 007 HESPUNDOR PAHI/SUB 201 202 203 204 205 206 207 208 01 001 001 005 003 004 003 003 005 005

uu£	3		E E 4	2 H 2 H 2 H 2 H 2 H 2 H 2 H 2 H 2 H 2 H	MAS II RECESSARY TO REWAITE THE SPECIFICATIONS BETOME PROCEEDING MITH DESIGN? A. YES (SPECIFY PERCENT REWAITIEN)	NS N		C ##	- x	E WE	TIEN ST	101	T T	S N C 2	=		7 		<u>.</u>							
			 	24453	YES, HOY YES, HOY YES, WEI N/A, KEI COMMENT	SPECIFICATION MENE AUGUSTEJ (ADDED) HOWEVER SPECIFICATIONS NEVEK REWRITTEN (ADDED) HEWRITTEN CONCURENT WITH DÉSIGN (ADDED) REQUIREMENT SPECIFICATIONS WERE NEVER WRITTEN (ADDED)	E E S I E S	PECT CON NI S	F C C C K	AUF 110N F1CA	S NE I	VER OES S WE	X = X 0 = 0 = 0 0 = 0 = 0 1 = 0	EVER EVER	EU)	DDE D TTEN	Š	u£u)								
PANT/SUB	NESPUNDUR 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 125 124 125 126 127 128 129 130	105	106	101	801	109	110	111	211	113	114	115	116	117	118	÷ :	120	121	122	123	24 1	25 14		9:	St 121 18	11 921 121 98
4 10	050		070		030	030 000 000 000 050	090	080	070		050		045 050	050			050 100	001	_	00	90 0	50 01	-	5 02	100 050 050 015 050	5 020 050 100
9 1 9	YES	YES		YES						YES					YES YES	yt s			Yt S						¥	76.8
J 10	C 0 #																									
0 10	C02											C 0 2														
PART/SUB	HESPONDOR 201 202 203 204 205 206 207 208	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	122	, 555	5 5 5	2 4 2	25 2	2 92		27 22	209 210 211 212 213 214 215 210 217 218 219 220 221 222 223 224 225 226 227 228 229 230
۷ : 0	090		015 010	010		920	070	025 020 030 030	030			0.60		959	025 050 100	100			070	0 70	020 040 040 020	20	•		0 5 0	75 020 030 050
01 0	YES YES	YES			C 0 3					YES YES	YES		YES				TES TES	YES				ž	YES			
x 10	CNK																									

-	109 110 111 112 113 114 115 116 117 118 119 120 121 122 125 124 125 126 127 128 129		200 200	CO2 CO2	CO2 CO5				1 005	213 214 215 216 217 218 219 220 222 225 225 225 220 218 217 215	CO2 CO3 CO3	5 CO2 CO5	C02	۸.		CO2 CO3		100
AS NECESSARY TO HEWHITE THE SPECIFICATIONS, WHAT WAS THE CURIGINALLY NARHATIVE) (UNIGINALLY NARHATIVE) (UNIGINALLY NARHATIVE) (UNIGINALLY NARHATIVE) (CIFICATIONS WERE AMBIGUOUS, INCOMPLETE, AND/OR INCONSISTENT (CIFICATIONS WERE AMBIGUOUS, INCOMPLETE, AND/OR INCONSISTENT (CIFICATIONS WERE AMBIGUOUS, INCOMPLETE, AND/OR INCONSISTENT (CIFICATIONS WERE NOT PROJECT (CIFICATIONS OR REQUIREMENT (CIFICATIONS OR REQUIREMENT (CIFICATIONS OR REQUIREMENT (CIFICATIONS OR RECOIL OF THE NOT PREPARED.)	551 151 051 611 911 15	202			C02	200		20	C01 C01 C01	17 218 219 220 251 217		C 0 5	€05	203 205		C 0 2		C01 C01
AS NECESSARY TO HEWHITE THE SPECIFICATIONS, WHAT WAS THE CONSIDERALLY NARRATIVE) (UNIGINALLY NARRATIVE) CIFICATIONS WERE AMBIGUOUS, INCOMPLETE, AND/OH INCONSISSIFICATIONS WERE AMBIGUOUS, INCOMPLETE, AND/OH INCONSISSIFE IN HEUDIKEMENTS OF PROJECT NGE IN HEUDIKEMENTS OF PROJECT NGE IN HARDWARE OF SIGN NAL WAY OF DOING HUSINESS TOMER AND/ON DEVELUPER BECAME BETTER INFURMED TO TOTAL SABARY TO REWRITE SPECIFICATIONS OR REGULREMENT ER	2 113 114 115 116 11		~	CO2 CO2	s C02		C 0 5	C05	001	2 213 214 215 216 21		2 C02		C02	۲.			100 100 100
IT WAS NECESSARY TO HEWHITE THE SPENDARY (UNIGINALLY NARHATIVE) ENHOUS IN SPECIFICATION SPECIFICATIONS WERE AMBIGUOUS, IN CHANGE IN SCOPE OF PROJECT CHANGE IN HEUDINEMENTS OF PROJECT CHANGE IN HEUDINEMENTS OF PROJECT CHANGE IN HAKDWARE OESIGN NOWMAL WAY OF DOING HUSINESS CUSTOMER AND/OR DEVELOPER BECAME MAS NOT NECESSARY TO REMETTE SPEC SPECIFICATIONS WERE NOT PREPARED.	202		CO2 CO2 CO3 CO3		CO2 YES	C 0 2		C 0 2		7 208 209 210 211 212	CO2 CO3	C 0 2		C02	C02 C02	20 CO2 CO3		601
REASON?	KESPONDOR 101 102 103 104 105 106 107		C02 C02	5 C05	203			C 0 2	103 103	HESPUNDOH 201 202 203 204 205 206 207		C02		C 0 5		C 0 5		100
	RESPONDOR 101 102 103	₹00	900	C 0 2					103	RESPUNDOR 201 202 20	-						UNK	101 601
OUE 3 1 1 ON 29	PAM1/SUB									PART/SUB								

	26 127 128 129 130	YES CO2	C 0 2	YE.S	010	080				703	052 622 558 558 580	VES VES	YES	Tt S		080			
- a 3	921 521 821 150	YES YES YI			100	\$60					553 554 552 57	YES YES	YES YES	TES TES PUL TE	YES YES	x	res		
S THE KEUUINEMENT EVELUPMENT OF EVERONED O BE TRACKED ENT OF ACCEPTANC ENTS COULD BE	122	YES YES Y			40 YES						5 552 152 058		707	YES Y					оти
TECHNIQUES ED BEFORE THE KEUUINEM ING THE DEVELUPHENT OF NG AND TIE EACH DELIVE UITHEMENTS. WENT COULD BE TRACKED) DEVELOPMENT OF ACCEPT REQUIREMENTS COULD BE	116 117 118 119 120 121			res	YES 090 090						218 219	YES		YES Y		00			
SPECIFICATIONS WERE PREPARED: USING TOP-DOWN (HIEMARCHY OF FUNCTION) TECHNIQUES USING STRUCTURED DESIGN/FLU TECHNIQUES IN PHASES, WITH DESIGN/FLU TECHNIQUES IN PHASES, WITH DESIGN AND CODING STAMTED BEFORE THE NEUGHEMENT SPECIFICATION WAS COMPLETED IN A FORMAL REQUIREMENT LANGUAGE (DESCHIBE) IN SUCH A MANNER AS TO FACILITATE TRACKING THE DEVELUPMENT OF SUFTWARE FROM HEQUIREMENTS THROUGH CODING AND THE EACH DELIVERED SUFTWARE MODULE TO SOME PART OF THE REQUIREMENTS. IN PRECISE, MEASUREABLE TERMS TO AID IN DEVELOPMENT OF ACCEPTANCE TESTING (APPROXIMATELY************************************	113 114 115 116 1	YES	YES	YES Y	100	560		MIS			214 215 216 217	C 0 5		YF S		001 080 060	080	*	
SPECIFICATIONS WERE PREPARED: USING TOP-DOWN WITEHARCHY OF FUNCUSING STRUCTURED DESIGN/FLUM TECH IN PHASES, WITH DESIGN AND CODING SPECIFICATION WAS COMPLETED IN A FORMAL REQUIREMENT LANGUAGE IN SUCH A MANNER AS TO FACILITATE SOFTWARE FROM REQUIREMENTS HANDUA SOFTWARE MODULE TO SOME PART OF IN PRECISE, MEASUREABLE TERMS TO TESTING (APPROXIMATELY************************************	111 115 113 1	YES YES		YES	YES	YES	C 0 2	£		ОТН	211 212 113 5	YES YES	ES	YES Y					
SPECIFICATIONS USING TOP-DOWN USING STRUCTUME IN PHASES, WITH IN A FORMAL REQ IN SUCH A MANNE SUFTWARE FROM R SUFFUR STRUCK IN PRECISE, WEA IN STRUCK IN PRECISE, MEA IN SUREN SPECIFICATION N COMMEN!	1 011 601 901	>	YES	YES YES	YES						208 209 210 2	YES Y	YES YES		•	100	060	C04	
THE SPECTOR OF THE SP			>	8.	Y 560					HT0	205 206 207 2					080 060 090		Ú	
	RESPONDOR 101 102 103 104 105 106 107			YES YES YES			~		C02		204	YES		¥£.9					н10
9 M	_	71.3					C 0 2				HESPONDOR B 201 202 203			YES		YES			
4UR S T R UN	PART/SUB	▼ 10	9 10) 10	01 E	9 10	9 10	x 10	¥ 10	7 10	PAH 1/SUB	0 1 A	0 F	01 C	0 10	01 E	9 10	9 10	7 10

THE FULLOWING IS A LIST OF DOCUMENTATION THAT MAY BE REGULINED BY A SOFTWARE DEVELOPMENT CONTRACT. CHECK EACH DOCUMENT REGULINED IN THE PROJECT AND ADD REGULINED DUCUMENTATION NOT CONTAINED IN THE LIST (DOD MANUAL 4120,17M, DEC 1972)

UBJECT LISTING/DECK/TAPE

FUNCTIONAL DESCRIPTION--INITIAL DEFINITION OF A PROJECT WHICH SOUNCE LISTING/OFCK/TAPE

OPERATIONAL CAPABILITIES IN HE DEVELUPED (ALSO SOMETIMES CALLED PROVIDES THE ULTIMATE USER WITH A CLEAK STATEMENT OF THE

DATA REGULREMENTS DOCUMENT -- PREPARED BY HOTH SYSTEM AND USER REGULARENTS SPECIFICATIONS).

SYSTEM/SUBSYSTEM SPECIFICATION -- PREPARED FOR SYSTEM PERSONNEL, AS PERSONNEL WHEN A DATA COLLECTION LFFORT BY THE USER GROUP IS REGULARD TO GENERALE AND MAINTAIN SYSTEM FILES.

DETAILED AS PUSSIBLE, CUNCERNING THE ENVIRONMENT AND DESIGN ELEMENTS, IN UNDER TO PROVIDE MAXIMUM GUIDANCE TO THE PROGRAM

CONSIDERABLE DETAIL FOR THE PURPOSE OF GUIDING PROGRAM DEVELOPMENT DESIGN EFFOHTS ALSO DEFINES SYSTEM/SUBSYSTEM INTERFACES. PHOGRAM SPECIFICATIONS--PHEPARED FOR PROGRAMMERSS CONTAINS

DATA BASE SPECIFICATION--PREPARD FOR PRUGRAMMERS IN SUFFICIENT Detail to permit program coding and data hase generation by the PROGRAMMING GROUP. و

Ė

USERS MANUAL--IO PRESENT GENERAL AND SPECIFIC INFORMATION ON HOW A SPECIFIC COMPUTER PRUGRAM WILL BE USED (INCLUDES POSITIONAL HANDBOOK FOR REMOTE INPUT TERMINALS) (ADDED) COMPUTER OPERATIONS MANUAL--CONTAINS PRECISE DETAILED INFORMATION

ON THE CONTROL, REGULIREMENTS AND OPERATING PROCEDURES NECESSARY TO SUCCESSFOLLY INITIATE, RUN, AND TERMINATE THE SUBJECT SYSTEM. PROGRAM MAINTENANCE MANUAL--CONTAINS GENERAL AND SPECIFIC

INFORMATION FOR COMPUTER PERSONNEL RESPONSIBLE FOR THE MAINTENANCE THE COMPUTER PRUGRAMS.

TEST AND IMPLEMENTATION PLAN--CONTAINS AN URDERLY SCHEDULE UP EVENTS AND LISTS OF MATERIAL NECESSARY TO AFFECT TESTING AND DELIVERY OF A COMPLETE DATA PROCESSING SYSTEM.

TEST ANALYST REPORT -- DESCRIBES THE STATUS OF THE COMPUTER PROGRAM SYSTEM AFTEM TEST AND PROVIDES A PRESENTATION OF DEFICIENCIES FUR KEVIEM BY STAFF AND MANAGEMENT PERSONNEL.

SOFIMANE DEVELOPMENT PLAN (ADDED)

SUFIWAKE SIANDARDS AND REGUIREMENTS (ADDED) Management Repurts (added)

INTERFACE CONTRUL (ADDED)

BUDGET (ADDED)

PROGRESS REPORTS (AUDEU)

ERHOR/DISCHEPANCY REPORT (ADDED)

PROGNAM CHANGE REQUESTS/STATUS (ADDED) VEHSION DESCRIPTION (ADDED)

SOFIWARE PRODUCT/OUTPUT SPECIFICATIONS (ADDED)

DOCUMENTATION NOT REGUINED (ADDED)

PART/SUB	308	KE 3P	KESPONDOR 101 102 1	HESPONDUM 101 102 103 104 105 106 107	104	105	106		108	1 601	1 0 1	111	15 1	13 1	7	15 11	11 91	7 11	8 11	021 6	121	122	123	124	921 921 121 113 114 115 116 117 118 119 120 121 121 121 124 125 126 127 128 129	1 971	1 12	78 17		1 50
5	<	YES	YES YES	YES	_	YES	YES		_	YES Y	YES Y	YESY	YES Y	YES Y	YES YI	YES YE	YES YES	n		YES	YES	YES	YES	YES YES	YES	>	YESY	YES YI	YES Y	Yt 5
•	20	YES	Y t 3	YES YES YES YES YES YES	YES	YES	YES	YES 1	YES Y	YES	YES Y	YES Y	YES YES		YES YI	YES YE	res ve	YES YES	SYES	SYES	YES		YES	Yt S	YES	>	¥ 8.8×	YES YI	YES Y	YES
5	J		YES		YES 1	YES	YES 1	YES Y	YES Y	YESY	YES Y	YES	>	YES Y	YES YI	YES YE	YES YES	S		YE S	res	YES		Yt 3	Yt s	YES Y	YES Y	YES		
6	2		Y £ 3		Y £ 3		_	YES Y	YES Y	YES			>-	YES Y	YES	¥.	YES YES	ဟ		YE S	YES	. YE S		YES	YES			Ξ	YES Y	YES
10	w	YES	YES	YES	YES	YES	YES	~	YES Y	YES Y	YES Y	YESY	YES	~	YES YI	YES YE	YES YES	S		YES	YES	YES	YES	YE S	¥ t 8	>	YES		>-	YES
6	•	¥ £ 8	YES	-	YES 1	YES	YES	~	YES Y	Y	_	YES Y	YES Y	YES		YE	YES			YES	res	YES	Y & 9	YES YES	YES	YES Y	YES Y	YES YE	YES Y	Yt S
5	و		YES	_	YE 8	_	YES	YES	_	YES						X.	YES YES	ø		YES	YES	YE S	YES	YES	Yt s					
6	I		YE 3	YES YES 1	YES 1	YES 1	YES 1	YES Y	YES Y	YES	>-	YES	>	YES Y	YES	¥.	YES YES	SYES	ø	YES	16.5			YES	Yt S	>	YES Y	YES YE	YES Y	X & S
5	-		YE S	_	YES 1	YES	YE 8		_	YES			>	YES	¥	YES YE	YES YES	SYES	SO .	YES		YES	YES	YES	YES		>	YES YE	YES Y	YES
5	7	C 0 3	YES		YES 1	res 1	YES		-	YES						YE	YES YES	ဘ		YE 9		YE 3	YES		¥ 8				×	YŁS
5	¥	168	YES	YES 1	YES Y	YES 1	YES	-	TES Y	YES	>	YES Y	YES Y	YES Y	Y t S	*	Yt S			YES	YES	Yes	YE S	YES	YES	>	YES Y	YES	-	rt S
=	_	YES	YES	YES Y	YESY	YESY	YES		>	YES			<u>~</u>	YES		YE	Yt S			YES			YE 8	YES	YES	>	YES Y	YES.		
10	I												ن	C 0 2						C02	_		C 0 2							
5	z												၁	200																
6	9																						203							
6	2																						C 0 5							
10	•															C 0 2	~													
5	¥															C 0 2	~													
6	7														0	0ТН														

PART/Sub	81187	HE 3P	MESPUNDUM 201 202 203 204 205 206 207 208	203	204	205	404	207		2 607	210 211	1 212	213	214	214 215	216	217	725 625 625 625 625 625 625 615 615 615 615	7 61	7 07	2 17	77 77	3 22	12.5	2 226	127 0	228	559	450	_
=	•	YES	YES YES YES	763	YE 3	YES YES	YE S	YES YES	YES	Z	YES TES	တ	YE S	Yt S	YES	YES	rt s	>	YES Y	Yt. S	F	Yt. S	YES	တ		YES	res	YES	Yt S	
=	2	YES	YE 3	Yt S	7 th 5	Y ES	YES	YES	Y E 3		¥	YES YES	res	YES	rt s	¥ 5	YES	YES Y	YES Y	Y ES	*	Yt S	YES	s yts	SYES	s res	TES	Yt S	Yt s	
5	U	YE 3	YE S	YE S	Y £ 3	YES YES	YES	YES		Ž.	YES YES	တ		YES	YES		YES	YES Y	YES Y	YES YES		rt s	Yt S	SYES	SYES	SYES	YES	YE S		
5	٥		Yes		YES		YE.S		YES		YE 8	ø			YES			YES Y	YES		Ĭ	X X		v t s	SYES	rts	res	YES	YL S	•
5		YES YES	YE 3	C 0 4	YE S		YES		YE S		YES	ະກ	YES	YŁS	Yt S			Yt s	>	YE S	F	Y L S	YES	SYES	S YES	3 YES	YES	YES	YES	
-	u.	YES	YES		YES	YE S	YES		YES		YES	S)	YES				YES	TES Y	YES Y	YES Y	YES Y	YES	YE S	s yts	s yts	YES	rt.s	YE S	YES	<i>'</i> •
5	و		YES		Yt S		YES				YES	Ø	Y E S		YŁ S		YES	>	YES		Ē	rt s	71.5	s Yt S	SYES	s ves		YE S	¥£ 3	-
5	I	Y & 9	YE S	YES	YE S	YE S	YE 3	YES YES	YES		YES	ဖာ					YE S 1	YES Y	YES Y	YES Y	YES Y	16.8		YES	SYES	s rts	YES	YES	YE 5	-
6	_	YE S	YES	Y & S	YE S		YES		YES		Y	ø			YES		YES	YES Y	YES Y	YES	¥	YŁ S	YŁ S	s		YES	YES	YES	Yt S	
5	7		YES		YES YES	YE.S					YE 3	ø			rt s			>	YES				YE S	တ	Yt S	s rts	1 1 5		11 S	'0
0	×	Y E 3	YES		YES		res	res yes	YES		16.5	ø,		YES	YE S	YES	YES	>-	YESY	YESY	YESY	YŁ S	YES	SYES	S YES	3 YES	YES	YES	YES	7 0
-	ب	YE 3	7 £ 3		163		16.5		YE S		7	YE.S		YES	YES	168	7£.9	~	Yt S	>	YES Y	725	YES	STES	so.	YES	S YES	_	¥1.5	'n
-0	I						C 0 2		203										3	C 0 2									707	21
6	0	C 0 2																												
0	3	C 0 2																												
=	ø							20 0						C 0 2																
5	-	C 0 2						C 0 2						C 0 5																
0	-	C 0 2							C02																					
5	>	C 0 2		C 0 2										C 0 2																
5	>								•	C02																				
5	~								H 10													5	01H				H10			

YES

Y + 5

YES

Yf S YES

YES YES YES

YES YES

YES YES YES YES YES

0 1 E

YES

A SPECIFIC COMPUTER (THIS MASS	909 110 111 112 113 114 115 116 117 118 119 120 121 123 124 125 126 127 128 129	DEL DEL DEL DEC CDC GEC UNI GP4 GMI GMI GMI GP7 GMI GP4	012 BUA YES	50x . 400 YES 504 145 YES 523	YES YES YES , YES YES	75x 7ts 3HT 5-2 SHI 6-6 BOX	710	FOR FUR FOR JUV FUR CMI ASS YES CUB
40E ST 10N 52	ONDOR 102 103	01 A1 N/S N/S 16M 01 A2 SLG SM1 GPS	01 AA 060 YES	01 B 963 653 YES	OI HH YES	01 C YES HTS	J) 10	01 D CM1 CM1 30V COH

9 10	4 E.S.			Yt S	74.3		ve s	ø		YES	'n	rt s	
E	YES					71.5		¥ \$					
1 10		YES									YES		
r 10	YŁ S			YES YES	<i>'</i> A						Yt S	Yt S	Yt s
¥ 10	YES		YES									rts	
1 10		YES YI	YES	YES YES		YES		X F S	YES	s YES	ú		
1			YES			res		rt s	rts	YES	ýn.	Yt s	20
2 0		YES											
0 10							YES	s					
5							3.2	ر. ما					
0 10	YES YES YES YES		YES	S YES YES	s yes	res res		res res	TES TES	YES YES	s yes	¥ t S	
æ	YES YES YES		YES	S YES YES YES	, YES	74.8	YES	ຫ	YŁ S	YES YES	ú		
8 10	YES YES YES		Y £ 9	YES			YE	YES YES	YES YES	YES YES	s YES		Yt S
1 10	YES YES	14	YES YES YES	3 YES			YES	တ	YES YES	YES YES YES	s yes		YES YES
7 10	76.5			YES YES	**			YES				YES	
> 10	2 1					74.5		I I	SE I HWR				
A 10		705			ū	203							
PAHT/SUB	HESPUNDOR 201 202 203 204 205 206 207	1 205 206 21		208 209 210 211 212	513 514 515		216 217 218 219 220 221 222	0 221	545 223	224 225	223 224 225 226 227 228 229 250	22825	9 250
01 A1	16M N/S N/S		181	181	IBM IBM LIT	11	130	_	N/S			כסכ כסכ כחָכ	coc
01 A2	GP6 SMI SLG		SH1	IWS	S INS INS	SMI	EM1	_	918	_		686 686 684	499
01 A3					רוו רוו								
01 A4					INS INS								
VV 10		14	YES YES	910	0	012						012 015	
9 10	PCT YES 643	_	YES	70x					£ 8 #	483 YES		246	•
01 88						YES	Yt s	YE S		YE S	m	YES YES	3 11 5
) 10	YES PCT VES ATS		2-5	SRT 15X		SHI			1 7 3	Yt S	202 202	. X.	SAT YES

1	JJ 10													9	,			,		
14	0	F 0.8	FOR	LAC	₹			HAL		37 V			3	5				0 56		
15	01 E		7£8 Y	8	*	of.			1				¥	3				7	10V COB	
14.5	01 6		× 6 8 ×	<u>م</u>		1		6	16.5 16	s 7t s	-	rts		¥ F.	TEST	ts Tts	16.8		ES YES	
1		×	?	2 4										YE						
15.5 15.5	I	!		2		3		7£ S		~	res			YE		YE3	res res	YES	YES	
Interpretation TES	1 10					7 53			47 837	v									Yt S	
YES YES <td>۲ 10</td> <td>YE</td> <td></td> <td>a).</td> <td>YES</td> <td>7 £ S</td> <td></td> <td>YES</td> <td></td> <td>,</td> <td></td>	۲ 10	YE		a).	YES	7 £ S		YES		,										
YES YES <td>0 X</td> <td></td> <td></td> <td></td> <td>7.6.5</td> <td>YES</td> <td></td> <td>YES</td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td></td> <td></td> <td></td> <td>YES</td> <td>YES</td> <td>YES</td> <td></td>	0 X				7.6.5	YES		YES					3				YES	YES	YES	
YES YES <td>7 10</td> <td></td> <td>*</td> <td>83</td> <td>YE</td> <td>S YES</td> <td></td> <td>YES</td> <td>YES</td> <td>J.</td> <td>٠ ٧</td> <td>a در</td> <td>222</td> <td></td> <td></td> <td></td> <td>YES</td> <td></td> <td></td> <td></td>	7 10		*	83	YE	S YES		YES	YES	J.	٠ ٧	a در	222				YES			
YES	M 10	YE.S	YE	ون بد		YES				2		n L				YES	Y£ S	YES		
YES YES <td>z</td> <td>res</td> <td></td> <td></td> <td><u>*</u></td> <td></td> <td></td> <td>YES</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>YES</td> <td>¥</td> <td>s)</td> <td></td>	z	res			<u>*</u>			YES									YES	¥	s)	
YES		res																76.3		
YES	3		YES YE	97	res re		r. S	YES	YES YES		S. 3.	0 4 2		3	:					
YES	~		YES YE		YES YE	S YES YI	ES				2 2				TES YE	SYES	'ts vts	YES YE	Sites	
YES	ø		YE	ø	YES	_S n.				2			=	တ	YES YE	YES	ts YES	YES	YES	
YES	_		YES YE.	ø	YES	_C A		913				20	¥.	တ		YES	YES	YES YE	Sytes	5 0
TSH CCH YES	_							C .	ı		YES YE	aj	7.	S	*	SYESY	ts rts	YES	¥1.5	
YE 3	_		1SH	2				T	YES YES		YÉ	s		vt s	YE	sn.	YES	¥ *	S YES	
					YE 3												SAR	N S		
								2												

K7G CMB K1F K4C K1B

H4B H1L H4F R9A H4E

DSA UTH

F & X

ž

£ 16

01 003

01 004

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 RZA CIG R7A RII MIS R38 NIP MIS CVD MIS RIB R7D MIS MIS HIJ MIS R7H MIS KII MIS KIC MIS K4A K1A KKA MIS KKB R9F K4D KIF N9E U66 CMU RZB K4A K1J RESPONDOR 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 250 MIS MIS HIM HAC MIS CRA RRA RGA RGF MIS RUG RIJ KIJ XIC MIS DUC R7A KIJ R7E MIS MIS H7B DSD KUC MIS RIJ D71 DSA PBA H7A RIC RID 7 4 C HAC DIA H 7B NAU RIB 7 2 P 3B V 4 A IF YOU COULD AFFECT THE METHOD BY MHICH REDUINEMENTS WERE SPECIFIED. ON WERE ABLE TO INITIATE RESEARCH INTO IMPROVING THE REGULINFINIS SPECIFICATION FUNCTION, WHAT ACTION MOULD YOU TAKE? 3 CMC CMA X7E HYF H7C CHE CME H7F PBA X1F X90 KOA KIN CVE CHC RAB 2 H3C HIF RAA R9A HSA RIJ CTE RESPONDOR 33 **UUE STIUN** PART/SUB 01 001 200 10 004 PART/SUB 100 10 01 003 01 005 01 002 =

C 0 3

230 Y£ S

150 Yk. Cus

	01	YES						0.				Yt.S			
	<u> </u>	¥				N				ဟ	~	¥£			
	21 5					200		1 22	•	YE S	00 500	,			
	126		YES					377	YES		00	165			
	127		YE S		YES			227		YES		Yt. S			•
	126		Yt s	500	Yt. 3			977		YE S		Yt s			
	571	Yt S	re s					525		11.3	900	YES			
	112 113 114 115 116 117 118 119 120 121 122 124 125 126 127 128 129 130		YES YES YES YES YES	100				209 210 211 212 254 255 256 257 255 155 055 818 818 15 815 815 815 815 815 816 817 818		YES YES					
	2.5.1		-				нто	2 5 2		_	003	YE S	ı		
	7 7			003 005			9	7 7			0 500	YES Y			H C
ON? E	-			ă	S			1 5,		S	ă				ā
20 C T T C C C C C C C C C C C C C C C C	21		"	ın	SYES			25 0		YE S	: 0	s yt s			
P K I V	21		YES	002	YES			77			4	YES			
DE 3 NING PL AN THE E	119	YES						518			005				
DAN TO OK NAME OF THE NAME OF	9				YES YES			218			003 003 005 YES				
ING HE F YED HOW ES F	117				YES			217			003				
T L L L L L L L L L L L L L L L L L L L	911	YES	YES	YES	YES			916						NON	
MATE PA	S 115	-		100	YES			515		YE S	004	YES		_	
PLANNING FOR THIS PROJECT DID/WAS! THE PROJECT MANAGER USE A FORMAL PLANNING GUIDE? THE CUSTOMER ACTIVELY PARTICIPATE IN THE PLANNING FUNCTION? A WORK BREARDOWN STRUCTURE (WBS) EMPLOYED IN PLANNING THE SOFTWARE DEVELOPMENT? (APPROXIMATELY HOW MANY LEVELS?) THE PROJECT DIVIDED INTO SEPARATE PHASES FOR THE PORPOSE OF PLANNING NONE (ADDED)	3			•	YES 1			7		YES 1		_			
A A A A A A A A A A A A A A A A A A A	13.1		Yt 8		>			13 2		YES Y					
USE USE V P. PUCTO	2		Ξ	=				5 2		>		øs.			
SER STR	Ξ	ø		4 001	ဟ			~		s	7	s YES			
THIS MANA ACI OUWN OIVI	111	YE S		900	YES	~		21		9 YES	003 004	YES			
OF VERNICAL CONTRACTOR	Ξ					C 0 3		7		Yt 3	00				
ING FUR PROJECT CUSTOMER WHE BEEN PROJECT (ADDED)	8 109 110				YES						Y £ 8	YES			
THE CUSTON THE CUSTON THE CUSTON THE CUSTON THE PROPER BY SOFT THE PROPER PLANNING PLANNING FORMER TO THE PROPERTY TO THE PROP	108				768			208		YES	700				
<u>s</u>	101			re s	YES			207			003 YES 00	YE S			
C C C C C C C C C C C C C C C C C C C	901	YE S		YES YES				206			003	YES YES			
	HESPUNDON 101 102 103 104 105 106 107 10	YES YES						RESPUNDUR 201 202 203 204 205 206 207 20				YES			
	3				YES			90			0 4				
	63			500	YES 1			03.2			006 YES 004	E 39			
	100x			0 4	>			100R			7 90	YES YES			
	HESPONDOR 101 102 1		un:	006 004	S			RESPUNDOR 201 202 2			ă	7	ø,		
35			Yt S	00	YES								S H		
40k ST 10N	PART/SUB	<	#	J	٥	>-	~	PART/SUB	<	20	J	٥	×	>	7
	ART	5	5	10	9	5	5	ART	5	5	5	5	6	10	0
7	1							2							

PART/SUB	RESPONDOR 101 102 103 104 105 106 107 108	3 104	105	100	01 4	701	-	=	11 0	= =	= 2	711 8	09 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	116	111	118	611	120	121	221	123	24 1	25 1.	9	21 12	8 12	1 50	_	
4 10											YE	YES YES	_						Yt s			YES							
9 10	YES YES	ø	YES	YES YES	æ	YES	~							YE 3									Ξ	Yt. S					
01 C	C 0 2																			-	YE S								
0 10	YES YES	øĵ		YES	m			YES	s YES	SYE	YES YES	.	YE S						YE S			YES			YES	S)			
01 E	YES YES		YES	TES	YE.	YES YES YES YES	yes	' 0	YES	•			Y & 8	YES	YE S	YES YES	YES			YES	~	YES C	C 0 2		YES	တ	Yt S		
01 F	C 0 2																							C 0.5	2				
9 10										00	COS COS	٥.		C 0 2							J	C 0 2							
1 10	(0) (0) (0)	Ţ.		2	100 100	_			3	נסו נסו	_		C 0 2	C02 C01				103	•	10:	6	CO1 CO1 001 CO1 CO1)))	=					54
٠ ١٥		NON	_																							C02	•		
7 10				01	_													н10			3	н 10							
PART/SUB	HESPONDOR 201 202 203	3 204	204 205 206 207	500	02 0	7 208	502 1	210	0 211	212	2 215	1 214	. 215	216	217	218	219	220	277 177	778	223 224		225 226 227	Se 23	7 228	622 B	250	_	
A 10	YES																												
9 1 0				YES			YES	'	YE.S	~	71.5	3 YES					YES	YES							YES	s ves	rt s		
0 10		YES	_	YES		YES		71.5	~		YES	YES YES			YES									YE	YES YES	23	YES		
01 E	TES CO.	CO2 YES	res			YES				Y & S			YES		re s	YES	YES	YES	Yt 5		_	YES YI	res	۲¢	res res	ø			
9 10	203																									C 0 2	•		
9 10												C 0 2																	
H	CO1 CO1 CO1	1 001		C 0 1	00	CO1 CO1 CO1	J	100 10	100				C 0 1		100	C01 C01	103	100	J	0 100	001	103	-		C 0 1	_			
x to																							MIS	S					
A 10														S						•	200								
2 10																-	UIH							HI0	I				

MHAI TUDLS WERE USED IN PLANNING THE PROJECT?

A. PERT
B. MODIFIED PERT
C. CPM (CURN)
O. GANIT
F. MURKLUADING CHAHTS
F. WULKSTONE (ADDED)
G. CSCS (ADDED)
H. WHS (ADDED)
Y. NONE
Z. UTHER

QUE 37 10N 36

HEADTETS USED IN STITUTED TO THE COLUMN OF THE LOSS OF
THE SPONDOH 101 102 103 104 105 106 107 108 110 111 112 113 114 115 116 117 118 119 120 121 123 124 125 126 120 120 120 120 120 120 120 120 120 120
109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 74.5 74.5 74.5 74.5 74.5 74.5 74.5 74.5
109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES
109 110 111 112 113 114 115 116 117 118 119 120 121 123 124 125 126 127 128 129 74.5 74.5 74.5 74.5 74.5 74.5 74.5 74.5
109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 7ES YES YES YES YES YES YES YES YES YES Y
TES YES YES YES YES YES YES YES YES YES Y
109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES YES YES YES YES YES YES YES YES YES YES YES YES YES
109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES
109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES
109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES
109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES
109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES
109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES
109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 Yes yes yes yes yes yes
109 110

129 130

7t S 7t S 7t S 7. S. Y. S. Y. S. S. Y. S. S. Y. S.

7t S C02

OUE ST LON	20	=	THE FORM	ULA APPHOACH	(AND/OK	UTHER ESTIMATIN	THE FORMULA APPROACH (AND/OR UTHER ESTIMATING TECHNIQUE) WAS USED	a		
		A A E	COMPUTER TIME OCCUMENTALION		UR VAKIAB	LFS CONSTUERED	ELEMENTS OR VARIABLES CHNSTUERED (AUDED) (GLSEN 1477) IME ION	_		
				MILE PREPARATION/CONSTRUCTION	NSTRUCTIONS AND AND ADDRESS OF THE A	MOTE PREPARATION/CONSTRUCTION MAILO MANAGEMENT M. ANY DRIVEN AND THE PRINCIPAMMENS				
		.	KE YPUNCH	K						
		: <u>-</u>	0FF 1CE	SPACE						
		- ×	PENSONN	PERSONNEL EQUIPMENT, 1.4., DESKS, PROCHAMMEN PROFICIENCY	, let. D	ESKS, PENCILS,	PENCILS, PAPER, ETC.			
		: :	PROGRAM	PROGRAM COMPLEXITY/FUNCTION	FUNCTION					
		íź	NUMBER	TESTER PROFICIENCY NUMBER OF MODULES (SUB ROUTINES)	SUB KOULL	MES)				
		· • •	LINES OF	LINES OF CODE (ADDED)	(0)					
		ii	SIZE OF REGUINE	SIZE OF PROGRAM (ADDED) REGUINEMENT SPECIFICATION	3 5	COMPLETENESS (ADDED)	£0)			
		œ. ø	CUSTOME	CUSTOMER SUPPORT (ADDED)	0010)					
		; <u>-</u>	AVAILAB	AVAILABILITY OF SUP		SOF TWAKE (ADDED)				
			CALENDA							
	,		3175 67	SIZE OF UNION BASE (AUDEU)	AUDED)	SYSTEM (ADDED)				
		· - ~	NOT USED	0						
		•				٠				
PART/SUB	RESPUNDOR 101 102 103 104 105	106	107 108 1	00 110 111 1	11 511 51	4 115 116 117 1	108 109 110 111 112 113 114 115 116 117 118 119 120 121 123 124		125 126 127	1 971
4 10	YES		YES			YES			YES	
200	YES	YES	YES	YES Y	YES			Yt S	YŁS	
010		YES	YES						Yt S	
0 1 0	YES	YES	YES						Yt. S	
01 E		YES								
01 F		YES	YES	YES				rt S	Yt S	
9 1 0				YES			·			
E .		YES								
9 10	YES	YES YES	YES	YES						
) IO	YES	Y£ 8	YES	YES Y	YES YES	YŁS		YE S		
				YE S				YE 9		
200	res re:	YES YES	YES	YES	YES	vt s		YŁ S		
0 1 0				J	C02 C02	C 0 2		C 0 2		
9	-									

3		C 0 2														
3			503													
1 10		C 0 2		7 00	24											
o 6				C02	ο.											
7 0												C 0 2	CO2 CO2			
× 10							S I E									
, 10 T	NON NON NON	NON	NON C 01	103		NON		NON	NON CO1 CO1 CO1 CO1	1001	2 (0.2			00	C01 NON C01	
7 10		н10			01H											
PART/SUB	HESPUNDOR 201 202 203 204 205 206 207 208	5 206 207	208 209	209 210 211	212	213 214	22 PES ESS 222 125 025 612 818 118 918 518 618	217 218	219 22	0 221	2 777	23 224	2.522	22 922	551 558 558	052
0 1 A		YES	76.8		7 \$ 5				YES	YES	YES YES Y	YES YES	YES YES	YES	on.	
2		YES			YES				YES YES	SYES	YE S	YES YES	YES	YES	ø	Yt s
01 C		YES									>-	YES	YES	YES	'n	
0 10		YE S						C 0 2		YES	Yt S	YES	YES			7£ S
01 E		7 £ 8											YES	YES	ø	
9 10	YES	YE 9								YES	YES YES Y	YES	rt s	YES	ø	
9 10										YE S	7 t S	rt s	Yt s	YES	so.	
н 10		YES														
1 10		YES														
r 10		YES														
¥ 10	YES		YES			YES YES			YES	s	>	TES TES	YES	YES	s	
01 L	YES YES		YES		YES	YES		YES	YES	SYES	¥ 5	YES YES	YES	YES	n	YES
											>	YŁS	YES	YES	n	
2 0	CO2 YES		YES						YŁ	YES YES	YI S	YES YES	YES	YES	S	
o :0			C02								>	7 t S				703
9 10	C 0 2							C07 C05	203		707					
s 10	C 0 2					202 CO2										
	C 0 2															
Y 10	NON COI NON	NON I		NON COI	_		NON NON NON	NON					•	100	NON COI	_
7 10	HIO															

40£ ST [0N	3	AFIEK THE URIGIN. Deitkmined and Si Custumer Wasi A. The Delivem	UMICINAL SUFIMARE 3 AND SUBMITTED FUR 1431: ELIVEHY DATE SHORTE	TWAKE DEVELUPMEN ED FUK REVIËM BY SHORTENEU BY SEN	AFTER THE UNICINAL SUFTWARE DEVELUPMENT PLAN AND SCHEDULE WERE Determined and submitted for review by seniur management and/ok Customer wasi A. The delivery date shortened by seniur management	EDULE WERE HENT AND/UR	
		B. THE DELIVERY C. THE DELIVERY D. THE DELIVERY E. THE OCLIVERY F. THE REDUINEMENT G. RESOUNCES HEE Y. NO CHANGE (AI	PY DATE NY DATE NY DATE EN DATE EMENTS (REDUCED (ADDED)	DELIVERY DATE SHOWTENED BY THE CUSTOMER DELIVERY DATE LENGTHENED BY THE CUSTOMEN DELIVERY DATE LENGTHENED BY THE CUSTOMEN DELIVERY DATE OFFICIALLY DICTATED (ADDED) HEUGINEMENTS CHANGED TO MATCH SCHEDULE (A UNCES PEDUCED (ADDED) HANGE (ADDED)	SHORTENED BY THE CUSTOMER LENGTHENED BY SENIOR MANAGEMENT LELGITHENED BY THE CUSTOMER CISTIGNAELY DICTATED (ADDED) CHANGED TO MATCH SCHEDULE (ADDED) (ADDED)		
PART/SUB	RESPONDOR 101 102 103 104 105 106 107 10	5 106 107 108 109	8 109 110 111 112	113 114 115	110 117 118 119	6 120 121 122 123	112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130
٥١ ٧				76.8		Yt S	YES
0 B	YES		00				
01 C				Y £ S	603		
0 10				74.3		res	Yt 3 Yt 5
91 E	203	C 0 2	200		C 0 1	1 005	C02
9 10		C 0 2					
9 10	C02						
x 10						N N	MIS MIS MIS
A 10	C02 C05	200 C02	C 0 2		C02 C03		C02
PART/3UB	NESPONDOR 201 202 203 204 205 206 207	208	209 210 211 212	212 213 214 215	216 217 218	219 220 221 222 223	224 225 226 227 228 259 250
V 10		CO3 YES		YES	YES		YES YES
9					YES	ø	res res
01 C							YES YES
0 1 0				res .		YES	YES YES
01 F	C01		C02 C02	•			C02
01 F							C02
9 10				C02 C02			
× 10	UNK #1	HIS HIS	811				
A 10	NON CO2	C 0.2		C02	C02	C02 C02 NON	NON
2 10				-	н10		

	130		YES				Yt S	YES		Y & S	Yt S	2		
	154 1	r s	YES Y	YES	YES	YES	YES Y	Ø	t s	YES Y	'n	res yes	25	
	1 971	YES YE	YES YI	YES Y	Ē	Ξ	YES Y	YES YE	res ye	TES Y	¥	Ξ	YES YE	
	7.		>	¥					=					
	6 127	SYES		'n			YES	s YES	'n	YE S			S	
	126	YES		YES		-		YES	YES				YES YES YES	
	125	YES	YES		YES	71.3	Yt S	YES		YES			YES	
	124	YES	Yt S	YES			YES	YES		Yt S			YES	C 0 2
<u>2</u>	123	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
	122	Yt s	YES		YES		Yt S	C 0 3	YE S	Yt S			YES	
THE FOLLOWING	121	X ES		YES	YES			YE 3					YES	
<u> </u>	221 121 021 611 811 115		YE S	YES			YES	YES					YES	
*	2													
<u> </u>	91													
¥ -	-							YES					¥ 8	
ž	116	YES	YE 3	YES	YE S	YES	Ø	YES YI	YES	ø	YES		YES YI	
DE VELOPMENT WHICH OF		7	76	7	7	7	YES	7	¥.	S YES	¥.		7	
PHOCESS OF SUFTMANE SYSTEM DE NG DOCUMENTS WENE PREPARED? OUECT MANAGEMENT SULUCE THANAGEMENT SCANIZATION ANTING AINING A	4 115			g	s		s	s ₂	s	YE				
AHE SYSTEM PHEPAHED? 15 14 HY ADDED) CTUME (ADDE	71.7			YES	YES		s ves	SYES	YES	S			:0	
HE S. CONF.	113						YES	YES		¥			res	
SUPTHANESS MENENTS HEMENTS UPMENT SELIVENY MANAGEMENT TING NCE (ADDED) STRUCTURE	112		YES	YES	YES		YES	YES					YES	
TERET LI BEEFE	===		YES	YES	YES		YES	Yt 3	YE S		YŁ S		YES	
A PART OF CORP. CO	9			YES	YE S		YES	YE S						
HE PROCESS OF SUPTHMANE SY PRUJECT MANAGEMENT HE SUUNCE HE WOUTHENTS ONGANIZATION STAFFING THAINING THAINING THAINING THAINING THAINING THAINING DOCUMENTATION DATA CONVERSION CHANGE CONTROL CONVETGURATION MANAGEMENT HEVIEM & REPORTING HEVIEM & REPORTING HEVIEM STANDANCE (ADDED) WORK BREAKDOWN STRUCTURE BUDGET (ADDED)	501		YE S	Y ES	YE S	YES	Yt S	YES		YES			YES	
HE PROCE NING POCE NING POCE NING POCE ORGANIZA SIAFFING SIAFFING SOFIWAR SOFIWAR CONFIGUR NONE CON NONE CON OTHER WE	108	Yt S	YŁ S	YŁ S	YES	YES	YE 3	Y £ 3	YES	₹ :	YE S	YE.S	YES	
- Z	107	Yt S			76.9			YES						
NYDICSILALICTROPEPTE	106	YES	YE S	YES	16.8		1 3	YES	YES	Yt S	YES		YE S	
				YESI	YESI		YES YES	YES 1	YES	YES	YES			
	104 105			YES Y	YES Y		~	>	YES Y	>	-			
	103 1	93		YES Y	YES Y		YE 3	YES	~				YES	
	UNDOK 102 1	YES YE	YE S	YES YI	YES YI	•	YES YE	YES YI	YE.S	S)	Ø		YES YI	
_	RE SPUNDOR 101 102 1			YES YE		S YES	YES YE	63	¥	S YES	3 YE			
● *		YES	7 k S	YE	YES	YES	YE	YE		YES	¥		YES	
0 t t t t t t t t t t t t t t t t t t t	SUB	•	2	J	٥		٠.	و	I		7	×	د	I
S 20	PART/SUB	•	5	5	5	5	5	=	-	5	5		10	0.1
•	•													

~		٠
7	t	J

5	z	YES Y	YES		YES	YES YES	Ē	YES YES	·A	YES			YES YES	20			74.5		2	rts rts rts	rt s		YES	YES YES YES	Yt S		
=	•																				203						
5	1																C 0 2										
5	•																70J										
5	-														NCN	N NCN	7										
PART/SUB		RESPONDOH 201 202 2	.ONDOH 202 203	204	305	305 206 207	207 2	208 209	9 210	211	212	213 214	215	216 2	217 218	8 219	9 220	221	777	223	224 2	127 972 572 BZZ 877 277 177 077	6 227		2 622 922	230	
5	<	×	YES COS	YES		¥ £ 8				YE S				>	Y E S	YES	m		7 t S		YES Y	YES YES	'n	YES	71.5		
5	2	YES Y	168	YES		YES	>	YES		YES			_	YES	YE	YES YES	′ 0				>	YES YE	YES YES	YES	Yt S		
6	U	YES		YES		YES	¥	74.8		YE 8			_	YES Y	YES YES	s Yts	s YES		7 t S				YES	YES	•		
5	۵	YES		YES	YES		YES YI	YES		YES			_	YES	YES	တ	YES				>	YES	YES	YES	Yt S		
5	w	YES YES	E S	YES																YŁS			YES	YES			
10		YES Y	76.8	YE 3	YES	YES	YES YI	YES YES	<u>ب</u>	YES	YES		_	YES Y	YES YES	ø		×1.	Yt S			Yt 8	8 YES	YES	YES	YES	
0	و	YES Y	YES	YES	·	YES	ž	YES YES	~	YES		YES	_	YES Y	YES YES	ø3			Yt s	YES	YES Y	YES YES YES	SYES	YES	Yt S	rt s	
10	Í	YES Y	ÝES	YES		YES	YES YI	YE 3	YE 8		YES				YES	s					>	YE S	YES	YES			
5	_	YES YI	YES	YES	YES YES	YES	7	YES	YE S		YES YE	YES YES	YES	>	YES YES	တ	YES		YES	YES	>	YES	Yt S	YES	YES Y	YES	50
•	· -	YES		YES		YES	*	YES			YES		YES Y	YES	YES	ø			YES		YES Y	YES YES	S YES	YES	×	YES	
5	×								YE S														YES		¥	Yt S	
5	۔	YES Y	YŁ S	YES	YES	YES YES 1	YES YI	YES YES	_	YES						YES	YES		Yt s	YES	YES Y	71.5	YŁ S		YES		
10	I	YES																					YES				
10	z			YES		_	YES YI	YES	Y £ 8		YES		YES				YES				YES Y	Yts		YES	YES Y	71.5	
5	0	YES																					Yt S				
10	j J	Yts																									

TION 41	FROM PROJECT INCEPTION THROUGH DELIVERY OF THE COMPLETED SYSTEM,
	APPHOXIMATELY WHAT PEHCENT OF THE TIME WAS SPENT BY ALL PERSONNEL IN
	DI ANNING MODE COLUMN TO A CALLACTURE OF THE CAL

9	500
29	0.0
26 1	0 - 0
27 1	15 0
۳ ۲	9 8
25 1	9
24 1	10 0
23 1	13 0
77	2 2
7 17	. T
20 1	0 50
1 61	0 5 0
18 1	10 0
17.1	0 5 0
1 91	0 \$1
15 1	₩ 70
*	0 5 0
1 5 1	12 0
1.2.1	0 0 0
1 11	15 0
108 109 110 111 112 112 114 115 116 117 118 119 120 121 122 123 124 125 12< 127 128 129 130	005 030 005 015 010 012 005 002 MIS 003 010 005 005 015 MIS MIS 010 010 MIS 015 001 010 005
30	30 (
90	500
	010
901	
105	0 7 0
* 0	003
- X - 0	MIS 003 040 005
PONDON 102 1	500
HESPONDON 101 102 103 104 105 106 107	8 1 3
	100
ART/SUB	0 :0
3	

HESPONDUR 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 250 010 UNK 010 010 010 010 010 010 005 015 005 035 030 001 008 002 030 010 020 040 010 003 010 007 030 020 015 025 005 010 PAKT/SUB 01 001

			RESPONDUR 101 102 103 104 105 106 107	005 010 033	010 010 033	050 030 033	002 030	010 510	010 010	•	500	HESPONDOH 201 202, 203 204 205 206 207	003 050 010	005 030 015	050 010	020 020	000 010	002 030 050	050	040	900	UNK	
			105 1	010	030	020	0 510	0 510	010			202	010	070	070	010	030	010					
PERC APPR			06 10	010	010 050	010 010	010 010	959	015 020			96 20	010	000 090	050 060	010	030						
IN A FURINER BREA FERCENTAGE OF THE AFFROXIMATE 100X) A. ORGANIZATIONA	STAFI DEVEL ADMIN	DE VEL DE SIG TE SI DOCUM NONE OTHER	2	900 010	5	0	0 005	010	0 045			1 208		•	9		0				,	. 3	
THER BREAK IGE OF THE IATE 100X)	FF PLANNING ELOPING CONTROL PROCEDU INISTRATION PLANNING LITY ASSURANCE PLANNING	DEVELUPING AN UVERALL PRUJECT MANAGEMENT PLAN DESIGN STAMDARDS (ADDED) TEST PLANNING (ADDED) BUCUMENT & CUNFIGURATION MGMT, PLANNING (ADDED) NUNE (ADDED)	601 B	010	0 010	0100	010	5 030	030			1 209	010	010	050	900	025	015	0 L'S			5	
_ E;	ANING CON TION SCHA	ANDAK VING L CUN	0	920	970	900	500	010	030			210	070	010	030	010	010	0 2 0					
DOWN FIRE PLAN	THUL PLAN	OFING AN OVENALL IN STANDARDS (ADD PLANNING (ADDED) (ENT & CONFIGURAT (ADDED)		010	0 500	010	0 500	0 0 0 0	0 0 0 0		•	2112	010	0 10 0	0 38 0	0 10	0 510	0 70					
UF PL WAS S INING	PROCE NING LANNI	LL PH 000 0) 0)	112 113	910 200	010 016	050 045	910	015 00B	005 016		6 5 5	212 213	010 020	010	050 020	010	070	0 2 0					
PLANNING Spenio	PROCEDURES INING LANNING	OJECT MGM I	3 114	9 00 9	6 001	2 004	015	8 025	6 015		0.35	3 214	0 025	959	•			050					
د مر 00 ه	.a	HAN F. P.		5 YES	_	-	•	٠.	.0		•	1 215	020	025	025			_					
UP PLANNING ACTIVITIES, APPRUXIMATEL WAS SPENT ON EACH OF THE FULLUMING? NING		MANAGEMENT PLAN , PLANNING (ADDE	1115 1116							M I S		216	YES	YES	YE S	YES	4+ 5	re s					
1t S, F 1HE		14 TV	117	030	030	900	005	010	020		J	217	050	010	070	500	010	035 (
APPROL.		AN.	117 118 119 120	0 0 0 0	0 10	0 010	0 500	0 500	0 0 0 0		0 010	218 21	0 010	0 020	0 010	0 0 7 0	ŏ	040					ě
APPRUXIMATELY FULLUMING?	::::	::::	19 12	070	010	510	910	010	050	M I S	010	219 220	002 040	010	025 040	615	020 520						0 ~ 0
-	X + + + + + + + + + + + + + + + + + + +	30 30 50 50 50 50 50 50 50 50 50 50 50 50 50		005	010	910	010	010	910	တ	0.45	122 0	0 010	0 8 0	•		•	050		0 8 0			
WHA! (SHUULD	* * * * * * * * * * * * * * * * * * * *	**************************************	122	900	010	005	900		075			222	0.05	015	010	900	015	0 4 0			010		
3			121 122 123 124 125 120							SIN		223 2	020	0 500	010	010	900	050					
			24 1	ð	Š					8 E		2 427	010	030 0	010	0 010	015 0	0.25 0					
			ş1 5 2	050	050					N I S		225 226	050 070	0 30 00 00 5	500 500	000 070	500 500	020 020		010			4,40
				410	010	070	015	070	020	vo.		6 227	0 015	5 045	5 015	010 0	> 005	010 0					,
			127 128 129							i S		228	010	010	900	0 3 0	200	040					
			129 150	000	000	0 2 0	6 5 5	510	0 8 0	H 1 S		229 230	020	500	020 020	070	050 070	015					0.40

HIO

C X

0Тн

	421	71.5			229		rt s
	971	TE S			228		rts
	07 108 109 110 111 111 112 124 125 126 127 128 119 119 120 121 121 124 125 126 127 128 129	YES YES YES			207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 223 224 225 226 227 228 229		YES YES YES YES YES YES
	126		Yt s		226		Yt S
	125		x + x		555		YES
	124		YES		224		Yt. S
	123		COS YES YES YES		223	YES	
	771	Yt S			442	YES YES YES	
	171	YES			221	11.5	
	120	YES			220		YES
	3.	YES YES YES YES			419	YŁS	
	118		YES		218	Yt S	
EN TS	111	Yt s			217	YES YES YES YES YES YES	
CK	116	TES YES			216	16.5	
7 a	115		YES		215	Yt S	
N T N T N T N T N N T N N T N N T N N T N N T N N T N N T N N T N N T N N T N N T	7	Yt S			214	11.5	
2 Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	113		YES		213	168	
SYSTEM MAS: Delivemed to Ive Usem as an emility Delivemed to Ime Usem in phased inchements Uimem	211			H I	212		YES
7 7 7 7	=	YES			211		YES
22	0 = 1	YES YES			210	¥ \$	
SYSTEM WASS DELIVENED I DELIVENED I UTHEN	40.		Yt S		209	1	
SYSTEM DELIVE DELIVE UTHER	R0 1			0 TH	208		
	107	YES			207		Yt S
A	106	CO4 YES			206	YES	
	105	0.0			205		YES
	0.0		YE S		204		TES TES TES
	KESPONDOM 101 102 103 104 105 100	YES			HESPONDUR 201 202 203 204 205 206		44.8
	RESPUNDOR 101 102 10		YES COS		HESPONDOR 201 202 21		
2	RESP 101		YES		HE SI 201		
QUESTION 43	PART/3UB	4 10	9 10	7 10	PANT/SUB	4 10	9 10

150 YES

QUESTION	4 4	7					HAS STAK A. YES B. NO C	WAS STAFTED? WAS STAFTED? A. YES B. NO (PERCE) 7 COMMENT	TEU?	NO TO EN	Sut 1	MARE ESIG	ans s	UL L MPL E	0 t s 1	TED? TED? PERCENT OF DESIGN COMPLETED WHEN CODING STANTED************************************	N 000	104 A Ing	L BE	FORE TED+	ANA	â	INC X)								
PAN1/SUB		RESPONDON 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	100k	01 80	10,	701		106	100	Ē	-	=		3 11		, 11,		7 111	=======================================	9 12	0 15	71 1	2 12	3 12	125	126	121	188	129	51	9
0 1 A		7£9				YES	, man											YE	YES YES	s				YE	YES YES						
9 10		20	IA 01	1 S 0 7	050 YES 075 030		YES	YES 085		0 05	0 YE:	S YE	5 07	0 02	0 03	060 050 YES YES 070 020 030 040	0 0 0 0	•		¥.	s 06	O YE	YES 060 YES 090	•		YES	YES 090		060 050 020	0.5	0
7 10			0	0ТН												0Тн	r										UTH	_			
PAH1/3UB		HESPONDOR 201 202 203 204 205 206 207 208	900R	93 20	4 205	5 204	, 201	208		210	0 21	7 5 1	12	3 21	7.	209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230	6 21	1 21	12 9	4 22	0 22	7.5	2 22	25.8	225	756	122	228	. 553	88	ā
A 10							YE 9	•	YES	S YES	æ								YE 3	ຶ		12.5	SYES	on.						YES	n
01 6		915	Z	50 S	YES 050 090 YES	o YES	,	YES	~		035	5 04	60 0	0 05	0 05	040 090 050 050 010 090 070	60 0	0 07	•	90	080 080	•		060	080	090	090 080 060 075 065 080	900	080	_	
0 x		Š	Ä												•																

A UA PROGRAM WAS:

A. APPLIED INFORMALLY
B. APPLIED FORMALLY AND DOCUMENTED SEPARATELY
C. APPLIED FORMALLY AND DOCUMENTED AS PART OF THE PROJECT MANAGEMENT
PLAN
Y. NOT APPLICABLE TO (OR USED ON) THIS PROJECT (ADDED)

UUL ST 10N 45

QUE 3 1 1 UN	o #	1 2 2	IN WHICH OF THE STANDARDS APPLIED DEVELOPED SPECIFI	OF THE FULLOWING ARES APPLIED AND WEHE THE DESCRIPTION LY FUR THE	LAS WERE FOR HESE COMPANY HIS PROJECT?	OF THE FULLOWING AREAS WERE FURMAL (AND/OR) DOCUMENTED GA APPLIED AND WEHE THESE CUMPANY-WIDE STANDARDS OF STANDARDS SPECIFICALLY FUR THIS PROJECT? (ADDED) (BUEING 1976) 01	DOCUMENTED GA DS ON STANDAR (NG 1976) OZ TIDE LUCAL	801 01		
		•	3	1		STANDARDS	S PRUJECT	.		
		₹ \$		N WN STRUCTURE	(WHS) CODE					
		ئ د	SCHEDUL ING	MF ASUREMENT						
			KEUUIKEMENI DUST ININAK	ANALYSIS DESIGN						
		נים.		Z						
		: 	16.51	ون						
			SUF 1	MARE VERIFICATION Ems and audits						
		. E	CONF D1SC	IGUKATION MANAGEMENT REPANCY REPORTING AND CORRECTION	CORRECTION					
		 	SOF T NC F OTHE	MARE ACCEPIANCE Ormal (or ducumented) ua n		STANDARDS (ADDED)				
PANE/3UB	HESPONDUR 101 102 103 104 105 106 107 10	4 105 106	8 109	0 111 112 11]	114 115 11	521 121 021 911 911 711 911 511 911 511 711 111 011	120 121 125	123 124	123 124 125 126 127 128 129 130	1 30
0 1 A		YES	YES	s YES	ν Λ			YES		
H 10	YE.S	765	YES	s YES	YES			YES	YES	
J 10	74.8	YES	YES	ø	YES			YES	YES	
0 10				76.8				YES		
9 10				YES	ss			YE 5		
9 I F			Y£ S	s YES	so.		7; S	Yt S		
9 10		YE S	YES	9 YES	er)		×1 ×	11.5		
		YES	¥£9	9 YES	s			YES		
1 10				YES	ss.			Yt S		
٠ To				YES	ss		YES	YES		
0 X	YES			YES	s YES		7F S	YES	765	
01 F	YES	YES	YES	s ves ves	ø		7. 2. 2.	YES		
1 O			YE 3	S YES	'n			YE S		
2				γE.S	s			YES		
× 10					SIN	ø	N S		SIE	
V 10	NON NON NON	NON N	NON NON NON		NON	NON NON NON	NON NON	NON	NON COA NON	NO.

	KE SPUNDON										•	
PAR 1/SUB		201 202 203 204 205 206 207 208	204 210 21	209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229	215 216 217	218	219 220	122 0	25 25 5	522 123	226 227 22	8 224 230
A 10			YES	YES		YES	YES YES			YE S	YES YES	s rts
8 10			r			YES	YES	~	YES YES		71.5	20
O 1 C	Y E S		YE 3			Yt S	YŁ S	~	YES YES	YES	YES	
0 1 0			-				Yt S		YES	YES		
01 €						Yt s	Yt S		Yt S	X 1.		
01 F	YES		YES	YES			YES			YE S		YES
9 10			YES	YES			YES			YES	7£ 3	YES
1 6							YES				YES	s YES
10			YES	YES		YES	YE S	>	YES			
r 10			-				res yes			YES	YE S	
01 K	YES		YES YES YES	ø		YES	Yt S	>	YES	YES	YES	YE S
01 F	YES		YES			YES	YES YES		YES YES			
1			YES			YES	YES	-	YES YES	YES	YES	
7 10						YES	YES	-	YES	rt S	72.5	
0 x	SI I	•										
01 Y	103	NON NON NON COI		NON NON	NGN NON NON NON			NCN	Z	NON	NON	001

PART/SUB			70	103	101 105 103 104 105 106 107 108	1 50	16	07 10		0 : 1	=	112 1	.1 3 1.	14 11	5 116	, 117	109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	071 5	171	175	52	24	125 16	92	7 10	71 8	~ ~	3
02 A	YE	YES Y	YES	7 t S	YE S				YE S		YES	Yt S		YES	S		YES	n	YES			YES	YES	=	YES YE	YES		
02 B					YES							YES										YES	Yt S	Y£	YES			
0 % C					YE 3	1 A	XES.				YES	Yt. S							YES			YES	YE S					
0 70		-	Yt s		7E 9	F	YES							YES	'n	Yt. S												
02 E		_	YŁ 3		YES	X	YES							71: 5	တ	YES						YES	YES					
02 F		_	YES	7£8	7£3	*	res				YES	Yt S		YES	ø							-	YES	ΥE	YES YES	Ø		
9 20		-	YES .YES		7 £ 3						YES	YE S		Yt s	ø,							-	YES	Y£	YES YE	YES		
02 H			Y E. S		YES						YES	YES		YES	s							YES	YES	Y.	YES YE	YES		
02 1	YE	YES Y	YE 3		YE S	7	YES				YES	YES		YES	n				YES			YE S		YE	YES YE	YES		
02 J		_	YES	YES	YE S	¥	YES		YES		YES	YES		YES	s	YES						YES	Yt s	YE	YES YE	YES		
02 K	YŁ	Y £ 3		YES	YES	7.	YES			,	YES	YES							YE S			YE S		YE	YES			
1 20	YE	Yt S		YES	YE S						YES			Yt S	s	YES			YES			YE S		¥	YES YE	YES		
0 × 11	¥.	YES Y	YES	YES	YE S	¥	YES		YES		YES	YES		Yt S	s	YES			YES			YES	X		7.	YES		
N 50	YE	YES Y	YES	YE S	yt S	Z	YES		YES			YES		YES	s				YES			YES	YE S		¥	YES		68
X 20															SIM			SIW								SIM	n	
02 Y					z	NON	ž	NON NON	z	NON		z	NON NON	NO			NON			NON	NON NON		ວ	C 0 4			N S S	z

HE SPONDOR

WESPONDUR 201 202 203 204 205 206 207 208		95 1	5 20	02 9	7 208	508	210	211	210 211 212 213 214 215 216 217 218 219 220 221 222 224 225 226 227 228 229 230	3 21	4 215	216	713	218	516	2022	7 178	77 77	13 22	4 225	7 977	27 24	8 224	430	
TES TES TES	YE S		~	YŁS	YES		YES	YES		Y & S	zo.						>	YES YES	'n				7£ 5		
TES TES TES	s 1ES	S)			YES	YES	YE S	YE S		7 1:	YES YES												YE 3		
YES YES	S YES	29			YE S		Yt S	YES		¥.	YES YES					YES					YES	¥.	YES YES		
YES YES YES	YES		YES	တ	YES	YES	YES				•			YES								YE	YES YES	YE S	
YES YES YES	YES		YES	ø	76.8	YES	YES	YES			YES												YES		
YES YES	YES	ø	YES	so	YES		7 E 3				YES			YES				YES	SO.			χĘ	YES YES		
YES YES YES	s YES	93	YES	ø	YES		Yt S	Yt S						Yt S				YES	an .			YES	SYES		
YES YES YES	S YES	S	YES	S	YES	YES	Y E 8	YES						Yes	¥t s			YES	si.		-	YES	YES		
YES YES YES	s YES	97	YES	so	YE S	YES		YES		YES	so							YES	တ		YE 3	YŁ	YES YES	Yt S	
YES YES YES	S YES	Ø	YE S	ø	YES	YES	Y	YES			YES			Yt S				YES	ø		YES	Yŧ	YES YES		
YES YES	8 YES	93	YE S	S	YES					YES								YES	so.			*	YES YES		
YES YES	s yes	77	YE S	s vts	8 YES			YŁS			YES	_									YES		YE S		
YES YES YES	S YES	93	YES	S YES	8 YES			YES			YES										YES	*	YES YES	7.t s	
YES YES	ø		YES	s)	y k 8	YES		YE S			YE S			_	Y t 3			#	7t.S		Yt S	YES	s YES	Yt S	69
M I S																									
									NON NON	z		NON	NON NON			z	NON		Š	NON NON					

	٠		'n			ဘ		
	~	·n	Yf S			Y S		
	15	YES						
	128	YES	YES	YŁ S	7 £ 5	72.5	Yt S	Yt S
	127		YE S	Y E S		YES	× + ×	
	56	£ 3	E.S.			35		
	25.	S	YES YES YES YES		Yt s	<u>بر</u>	11.5	
	7.	S YE	z ×	တ	YES YI	Z S		S)
	NB 109 110 111 112 113 114 115 116 117 118 119 120 121 125 124 125 126 127 128 129 150	YES YES YES YES YES YES	~ ₹) YES	Y.	YES YES YES YES	STES	¥ \$
THE	15	¥ £ 5	YES YES	Yt S		YES	Yt S	
TE TE TO	132	Yt S	Yt S	rt s	¥ 3		S	
THE TENTE TO THE TOTAL T	121	¥ £ 3		Yt. S				
TEST TEST TEST TEST TEST TEST TEST TEST	20	YES	YES					YES
CALLE CONTROL OF THE	1 61	>	ສ					~
CHNICAL AND ADMINISTRATIVE 1977) AT EACH PHASE (BLACK 1977) OF WORKING MATERIALS FIND, ITEM DEVELOPMENT, TESTING, ITEM DEVELOPMENT, TESTING, ITEM DEVELOPMENT, TESTING, ITEM DELIBERATE VEHIFIC STRICTIONS ON DATA INTERFA NIZCHILD RELATIONSHIPS BET S FOR MODULES AND/OR DATA NIZCHILD RELATIONSHIPS BET S FOR MODULES AND/OR DATA NIZCHILD RELATIONSHIPS BET TERUR SS SUPPORTABLE IN YOU PER REVIEWS OF CODE FUR RIPTION OF THE USERS IFHUM SMALL, HIGHLY INDEPE TO BE NIZONIOMATED UR CONFIG MANAGEMENT ILED UNIT, FUNCTIONAL, AND CHEATION AND CONTROL UP BA NG/RESOLUTION (BLACK 1977)	10		∓ S					
TO THE PERSON OF	=	~	ά. Τ					
11.0 A 1 A 1 A 1 A 1 A 1 A 1 A 1 A 1 A 1 A	=	Y & S	YES					
HANDERN FRUCKAMMER PRACTICES GIVEN BELOW WERE USED IN FLOWMENT PROJECT? MANAGER AUTHORITYBUTH TECHNICAL AND ADMINISHATIVE BILLITY FOR FRUJECT (HLACK 1977) LELIOMER MILESTONE REVIEWS AT EACH PHASE (BLACK 1977) LELIOMER FULLESTONE REVIEWS AT EACH PHASE (BLACK 1977) LAILON (BUCKASSIA 1976) JISCIPLINE AND VERFICATIONTUP-DUWN DESIGN, FORMAL DISCIPLINE AND VELLUPMENT, TESTING, AND DELIBERATE VEHIFICATION OF DESIGN, AND DELIBERATE TO PARENT/CHILD MELATIONSHIPS HITM (BLACK 1977) UNDOLLES, ADHERFOCE TO PARENT/CHILD MELATIONSHIPS HITM (BLACK 1977) LONVENTIONS-STRUCTURED NAMES FOR MODULES AND/OR DATA AND LESS OF MODULES (TOUR DON 1976) LONVENTHOUGHSDELIBERATE PEER MEVIEWS OF CODE FUNFATOR OF DESIGN (BASE) LONGENMENT IL AMSSA DEVELUPMENT ORGANIZATION AND UNDOLUBE STOURD OF THE USERS MODULES (TOUR DON 1976) LIBRAHIES AND FACILITIESUSE OF AUTOMATED UN STALLACD DESIGN, COATAGA AND COMFOL OF BASING (BLACK 1977) LIBRAHIES AND FACILITIESUSE OF AUTOMATED UN GESTING (BLACK 1977) LEBRAHIES AND FACILITIESUSE OF AUTOMATED WE TESTING (BLACK 1977) THE ABOUVE (ADDED) THE ABOULE STONE (BLACK 1977) THE ABOUVE (ADDED)	116		YES YES YES YES YES	YŁ S	YŁ S	rt s	Y t s	
THE PERSON OF TH	115	YE S	rt s			rt s	Yt S	
PREED TO THE PREED	3					_		
PRUGRAMER PRACTICES PRUJECT? AUTHURITYBUIH TECH ON PRUJECT (HLACK 19 MILESTONE REVIEWS AT FULDERSCAPTURE OF TO FACILITATE AND TIN NGRASSIA 1976) IN AND VERIFICATION COMPLETION OF DESIGN TO CODE (HLACK 1977) TYDEFINITIONS/REST ADMERFNCE TO PARENT 977) ADMERFNCE TO PARENT NS-STRUCTURED NAMES (1972) HUUGHSDELIBERATE P. 1971) STAND TACHURDON 1976 ONBUILDING SYSTEM F. 1971) STAND FORMAL DESCRIPTION 1970 TO THE	3 1	s,	YES	YES	eg.	on.	ø	
EEGEBOOK TIE 170 C FILTERENCH CONTROLL	= ~	YES	¥	¥	S YES	s YES	SYES	
A PARTICULA NATIONAL DE LA PARTICULA NATIONAL NATIONAL DE LA PARTICULA NATIONAL NATIONAL DE LA PARTICULA NATIONAL NA	=		_		YES	YES	16.8	
C LETTOPHE TECKETOR TO TO THE TERM TO TO THE TECKETOR TO THE T	11	YES	YE S		YE S	YES		YES
ALAELARE TO A SEA COLUCTO A SE	110	YES				YE S		
THE MUDENN PRUGRAMMER PRACTICES GIVEN BELUM MERE USED IN INTERVEDORENT PROJECT? KAM MANAGEM AUTHORITY-BUILH FCHNICAL AND ADMINISHAFIVE **UNSIBILITY FOR PRUJECT (HLACK 1977) **DEVELUPMENT FULDENSCAPTURE OF MUKKING MATERIALS FUR EACH **ITED ITEM TO FACILITATE AND ITEM DEVELUPMENT, TESTING, **ITED ITEM TO FACILITATE AND ITEM DEVELUPMENT, TESTING, **ITED ITEM TO FACILITATE AND ITEM DEVELUPMENT, TESTING, **ITEM TO SISCIPLINE AND VERIFICATION - TUP-DUWN DESIGN, FURMAL OF SIGN FUND (TO COMPETITION OF DESIGN, AND DELIBERATE VERIFICATION **ITEM MODULES, ADMERFINE TO PARENT/CHILD MELATIONSHIPS BETWEE **ITEM CONVENTIONS-STRUCTURE DISSING FORM SOURCES AND/OR UATA **ITEM MEMORIAL TO PARENT/CHILD MELATION AROUND **ITEM MEMORIAL TO PARENT/CHILD MEMORIAL TO BE AUTOMATED UN **ITEM MEMORIAL TO BESIGN, CUDING AND CONFIDE MANAGEMENT **ITEM CONFIDENCY TO PROULEM MEPORITION AND CONFIDENCY **ITEM CONFIDENCY TO PROULEM MEPORTION AND CONFIDENCY **ITEM CONFIDENCY *	6	YES		YES		S YES YES YES	YE.S	
350 E253333755555555555555555555555555555555	70	ø)	SI .	_	ŝ	S	77	
THE STATE OF THE S	-	s Yt	YE		7.6	7.	7.	
MHICH OF SOFT TAKE OF THE SOFT TAKE OF	HESPONDOM 101 102 103 104 105 106 107 10	SYES	'	m	25	:n		
	ě	YES	YE S	YE S	Y E S	YES		
	105	YES	YES			YES	YES	
	70				YE S	Y E.S		
	03	YE S	YE 3	YE S				
	RESPONDOR 101 102 1	YES Y	YESY	_	SO.	YES	Yt S	
	SPO 1	YES Y	YES YI		YES YE	YES YI	YES Y	
7	¥ 0	YE	¥		Y£	YE	×	
8 01	SUB	<	n	.	3	u.	_	ون
5 1 0 8 1 0	PART/SUB	5	5	5	0.0	0		6
5	3							

:	YES YES		VES YES	4 4 ¢	YES YES	YES	YES YES	7 t s 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	7 t s 7 t s	7 t s s s s s s s s s s s s s s s s s s	7 t s s s s s s s s s s s s s s s s s s	7 t s 2 2 2 2 2 2 4 4 5 5 4 4 5 5 4 5 5 4 5 6 5 6 5 6 6 6 6	7 t s 3 2 5 2 5 2 5 4 5 5 4 5 5 5 5 5 5 5 5 5 5	4 4 4 4 6 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	4 4 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	TE S S S S S S S S S S S S S S S S S S S		TES S S S S S S S S S S S S S S S S S S		4	4
¥£.8	71.5 7	X + 5	YES YES	7 t S 7 t S	**************************************	4	7	2	4	4 4 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	4 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	# # # # # # # # # # # # # # # # # # #	YES YES YES YES YES YES YES YES YES YES YES YES YES YES	7	7	7	7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	7 1 2 1 2 2 2 2 2 2 3 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Y	7 1 2 1 2 2 2 2 2 3 4 4 5 5 5 5 4 5 4 5 5 5 5 5 5 5 5 5 5	7	11.5 11.5
	3	=	: -	7E S	YES YES	YES YES YES YES	TES YES YES YES	7	TES	76 5 76 5 76 5 76 5 76 5 76 5 76 5 76 5	TES	768 768 768 768 768 768 768 768 768 768	7	7	7	TES	7	7	7	7	TES	7
	21.			YES	YES YES YES	YES YES YES YES YES	7t S 7t S 7t S	7 t s 7 t s	76 S Y	7£ S 7£ S 7£ S 7£ S	7 t S 7 t S	7 4 5 7 4 5 8 4 4 5 8 4 5 8 4 5 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Y	7 4 5 5 7 4 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	4 4 4 4 4 4 4 8 8 8 8 8 8 8 8 8 8 8 8 8	7	7 4 5 5 4 4 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	4 4 4 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	7 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	7	7 4 4 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
				YES	YES YES			218 219	218 219 YES	216 219 YES YES	218 219 YES YES	218 219 YES YES	218 219 YES YES YES YES YES YES YES	218 219 YES YES YES YES YES YES YES	218 219 YES YES YES YES YES YES YES YES YES YES	218 219 YES YES YES YES YES YES YES YES	YES	218 219 YES YES YES YES YES YES YES YES YES	Z18 Z19 YES YES YES YES YES YES YES YES	218 219 YES YES YES YES YES YES YES YES YES YES	218 219 YES YES YES YES YES YES YES YES	YES
	S +×						K K K K K K K K K K K K K K K K K K K	YES	YES	YES	768 768 768 768 768 768 768 768 768	YES	YES	768 768 768 768 769 768 769 768 768	YES	7ES	YES	YES	YES	YES	YES	KES CES AES AES AES AES AES AES AES AES AES A
YES	YES YES			'n	a a	\ F B	YES CO3	7 ts C03	7ES CO3 214 215 7ES 7ES	763 C03 214 215 765 765	76.8 C03 214 215 76.5 76.8	763 C03 214 215 YES YES YES YES	763 C03 214 215 765 765 765	763 763 763 763 763 763 763 763 763	YES	763 763 765 765 765 765 765	763 765 765 765 765 765 765 765	YES	763 763 763 763 763 763 763 763	763 763 763 763 763 763 763 763	76.5 76.5 76.5 76.5 76.5 76.5 76.5 76.5	76.9 76.9 76.9 76.9 76.5 76.5 76.5 76.5 76.5 76.5 76.5 76.5
	× E.			YES YES	YES	YES YES YES	YES YES YES	YES YES YES 722	YES YES 72.2	YES YES YES	YES YES YES YES	YES TES TES	YES 212	YES 212	YES 212	YES 212 YES	YES 212 YES	YES 212	YES 212 YES YES	TES 212 YES	TES 212 TES	TES 212 TES
	4 4 5 5 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5				YES YES	YES YES	res yes yes	YES YES YES YES YES YES	YES YES YES YES YES	YES YES YES 210 211 YES	7ES YES YES YES YES	7ES YES YES YES YES YES YES YES	YES YES YES YES YES YES	YES YES YES YES YES YES	7E3 YE8 YE8 YE8 YE8 YE8	7ES YES YES YES YES YES YES YES YES YES Y	YES YES YES YES YES YES YES YES	TES S S TES	YES 2111 YES YES YES YES YES YES	YES 211 YES	YES S S S X YES YES YES X YES	TES S S S S S S S S S S S S S S S S S S
YES	S YES Y				YES	YES YES	4 4 ES	YES YES	4 E S 4 E S 4 E S 4 E S 4 E S 4 E S 4 E S 4 E S 4 E S 4 E S 4 E S 6 E S	7 E S 7 E S 7 E S 7 E S	7 E S 7 E S	763 204 763	YES 204 YES YES YES	763 204 763 765	7 YES	7 YES 204 YES	YES	7 YES 20 YES 4 YES 5 YES	7 YES 3 YES 4 YES 4 YES 5 YES	7 YES	TES SOY YES YES YES YES YES YES YES YES YES YE	TES S S S S S S S S S S S S S S S S S S
	YES Yes yes				YES YES YES	YES YES	VES VES	YES YES YES YES YES 206 207 208	YES YES YES YES YES YES	YES	YES	YES YES YES YES YES YES	YES YES YES YES YES YES YES	YES	TES YES YES YES YES YES YES	YES	YES YES YES YES YES YES YES YES YES					
	YES YES YES			YES	YES	Ø ≯	¥ ES	¥ ES	7ES 205	7ES	768 768 768 768 768 768 768	768 768 768 768 768 768	7 ES 4 ES	4ES 205	7ES		7 KES 205 YES 4 KES 4 KE	4 K S S S K S S K S S S K S S S S S S S	4 E S S S C S S S S S S S S S S S S S S S	4	γ	4ES
71.5	YES		YES	YES YES	ES 4ES ES 4ES	ES YES FES FES FES FES FES FES FES FES FES F	8 8 8 × × × × × × × × × × × × × × × × ×	8 8 8 8 8	8 8 8 F	ES 4ES 7ES 7ES 7ES 7ES 7ES 7ES 7ES 7ES 7ES 7	ES YES 5 YES	E S YES YES YES YES YES YES YES YES YES	ES 4ES 7ES 7ES 7ES 7ES 7ES 7ES 7ES 7ES 7ES 7	YES	ES ES S S S S S S S S S S S S S S S S S	E 2 2 2 2 2 3 3 3 3 4 5 4 5	ES 4ES 7ES 7ES 7ES 7ES 7ES 7ES 7ES 7ES 7ES 7	7£5 7£3 7£3 7£3 7£5 7£5 7£5 7£5 7£3 7£3 7£3 7£3 7£3 7£3 7£3 7£3 7£3 7£3	ES S S S S S S S S S S S S S S S S S S	ES ES S S S S S S S S S S S S S S S S S	ES ES S S S S S S S S S S S S S S S S S	ES YES SES YES YES YES YES YES YES YES Y
	YES YES		 		VES YES YES	YES YES YES YES YES YES YES YES YES	YES YES YI	YES ACS 203 203 203	YES YES YE YES YE YES YES YES YES YES YE	YES YES YES YES	YES YES YI YES YES YI YES YES YI HESPONDON 201 202 21 YES YES YI	YES YES YE YES YE YES YES YE YES YES YE ZOL 202 20 YES	YES	YES YES YE YES YE YES YES YE ALS PONDON ALS YES YES YES YES YES YES YES YES YES YE	TES YES YES YE YES YES YES YES YES YES YE	YES YES YE YES YES YE YES YES YE ZOI 202 20 YES YES YE YES YES YE YES YES YES YES YES YES YES YES	YES YES YE YES YE YES YES YE YES YES YE YES YES	TES YES YES YE YES YES YES YES YES YES YE	YES YES YE YES YE YES YE YES YES YE YES YE YES YE YES YES	TES YES YES YES YES YES YES YES YES YES Y	YES	TES YES YES YES YES YES YES YES YES YES Y
				_			F F F							·								
	ר א ר'				z z		< 0 2 2 L	. – z z o > _ v			. Trrov Metro	C C C C C C C C C C C C C C C C C C C	. Trrov Q 4 such	. I z z o >				. Trrom Meror Lara	. 」 # # 0 >			

9UE 3 I 1 ON						2 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 -	T C C C C C C C C C C C C C C C C C C C	MHICH OF THE AACCOUNTED FOR AACCOUNTED FOR AACCOUNTED FOR AACCOUNTED FOR AACCOUNTED CO AACCTIONA B. DAIA WEGO C. SYSTEM/SU D. PROGRAM S. C. COMPUTEN G. COMPUTEN G. COMPUTEN G. TRAINING C. TRAINING	OXO KODSHA EMEN O O	GELUM LISTED DUCUMENTATIOCUMENT THA OCUMENT COVERED MONE THA VEREIN HIS GOVERED BY DUCUMENTATION NEEDER HIS GOVERNT OF THE NEEDER HIS GOVERNT OF THE NEEDER HIS SPECIFICATIONS SPECIFICATIONS WALL OPERATIONS MANUAL AINTEMANCE MANUAL AINTEMANCE MANUAL VST REPORT OCUMBE (ADDED) COURSE (ADDED) COURSE (ADDED) CESCHIFTION (ADDED) OF VELUPMENT PLAN (ADDED)	TO DE LES LES LES LES LES LES LES LES LES LE	VERED P ENT OF ENT OF UCUMENT 10N 10N 10N 10N 10N 10N 10N 10N 10N 10N	CALLED OF CENTER OF CALLED OF CENTER	10 N 1 A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	LE STE	BELUM LISTED BUCCHENIATION TYPES WERE USED IN THE PROJECT OCUMENT COVERED MONE THAN ONE AMEA, CHECK EACH ANEA THE INTENT OF THIS QUESTION IS TO DETERMINE WHICH VERED BY DUCUMENTATION NOT THE ACTUAL DUCUMENT FORM. 2 FUR DEFINITIONS 2 FUR DEFINITIONS 4 FUR DEFINITIONS 4 FUR LISTED SECTIFICATIONS 5 FUR LISTED S	S WE WE USED IN HEA, CHECK EACH IS TO DETENHINE ACTUAL DUCUMENT	USEL DETEN DECE	EACH MENE	THE PRESENTED TO THE PRESENTED TO THE PRESENT TO TH	#0 # # # # # # # # # # # # # # # # # # #	15							
PAHT/3U8	RES 101	RESPONDOR 101 102 103	iñ 103	901	105	901 801 701 901 501 h01	101	801		011		112 113	3 114		115 116	1117	117 118	611	116 150 151	21 12	52 12	128 128 124		, 751 851 851		128 129		1 30	٠
4 10	YES	YES	YES	YES	YE S	YES	YE 3	YES	YES	YES Y	YES		C 0 1	1 YES	3 YES	YES		-	YES Y	res v	YES YES	SYES	SYES	YES	YES	YES			
9 10	YES	YES		YES	YES	YE 3		763	YES			YES	\$ 601	1 YES	3 YES	,-			YES	F	YES	YES	s Yts			YES			
0 1 C	YES	YES	YES	YES	YES	YES		YES	YES 1	YE S	=	YES YES	S C01		YES	YES			YES Y	YES Y	YES YES	S YES	s Yt s	YES	YE S	YES Y	YES Y	76.9	72
0 10	YES	7 t. S	YES YES YES	YŁS	YES	YES YES	YES	YES	YES	YES Y	YES YI	YES YES	S		YES	YES			YESY	YES Y	YES YES	S Yt S	s YFS	YES	_	YES Y	YES Y	YES	
01 E	YES	YES		YES		YE S	YES	YES	YES	>	YES YI	YES YES	ø			YES			YES Y	Yts Y	YES YES	SYES	S Yt S			Yes			
01 F	Y £ 3	YES	YES	YES	res	YES		76.9	YES	>	YES	YES	100 S	1 YES	3 YES	res	YES		YESY	YES	7	YES YES	SYES			YES Y	YES YE	9	
9 10	YES	YES		YES	YES	YES			YES						YES	YES	YES	YES		<u> </u>	res yes	so.				YES Y	YES Y	YE S	
и 10	C 0 4	YES		Y E.9	YES	YE 3								YES	•••					-	rts yts	ø				YES Y	YES YI	YES	
1 10	YES	YES		YES	YES					>	YES Y	YES YE	S		YES			_	YES Y	YES Y	res res	SYES	SYES		YES	YES Y	Yt S		
C 10	C 0 2	_									u	C 0 2	00	_					70 0								ت	200	
																		Ū	C 0 2										
01 L																		J	C 0 2										
2 5																											ŭ	203	
7 10																		J	ОТН							O I H	Э	H.I.O	

082 455 855 755 855 855 855 555 555 155 855 815 815 715 815	TES	YES YES YES YES YES YES YES	YES	TES YES YES YES TES YES YES YES YES YES	TES TES TES TES TES TES TES TES	TES	TES YES YES YES YES YES YES YES YES	YES YES YES YES	YES YES YES YES YES YES	C02 C03 C05			
2 912 512 512 512 512 112 012 602	TES YES TES T	res res	YES YES YES	YES YES Y	YES YES Y	YES YES Y	À		YES YES Y	CO2 CO3			
20	YES YES	YES	s YES	S YES YES	S YES	s res res	S YES	ø,	S YES YES			~	~
MESFONDUM 201 202 203 204 205 206 207 20	IES YES YES YES YES	ves yes	YES YES YE	ES YES YES YES YE	YES YES YE	YES YES YES YES YE	YES YES YE	YES YES YES YE	ES YES YE			C 0 5	00
	YES YES YES	YES	YES YES Y	TES YES YES YES	Y & S Y	YES YES YES Y	YES YES YES Y	YES YES YES Y	YES YES YES	C 0 2	C 0 2	C02	CO2 YES
PART/SUB	۷ :٥	9) 10	0 10	9 10	01 6	9 10	10	1 10	7 10) 10	3	2 0

DUE S T I UN	PAR1/SUB	V 10	9 10) lo	0 10	3 10	9 10	9 10	# =	1 10	£ 10	V 10	;
3	HESPUNDOR 101 102 103 104 105 106 107 108		YES	YES YES	YES	YES YES	TES TES						
	20K 2-103		YES	SYES	S YES	şo.	ø						
	104					YES	7 £ 3						
	105				YES	YES YES YES YES	YES YES COZ YES		*				
E < BUQUESTAPEN	100					Y£8 1	C 02		YES				
CH SUF AUTURA MACKO UN-L II UN-L II UN-L II BATCH BATC	107 1			>	>		FES						
H SUFTWAKE TUULS. STRUCTURED PRE-CCAUTUMATE FLOWCH. LIBHARY MUNITORS MACHO PROGHAMMIN. UN-LINE DEHUGGING AUTOMATIC TEST C. SIMULATORS OR DR. BATCH DEBUGGING. STANDARDS AUDITU. OTHER TOULS.) I 90			7£.8	YES YES YES	YES YE	Ţ						
AKE I REFE ROCHA RUCHA RUCHA CAPA DEBU DEBU SEBUGG SEBUGG SEBUGG SEBUGG SEBUGG	7 60				S YE	YES YES	ES YE						
H SUFTWARE TOULS/ATOS WERE SELE- STRUCTURED PRE-COMPILERS AUTUMATIC FLOWCHARTERS LIBHARY MUNITORS WACHO PROGRAMING CAPABILITIES UN-LINE CAPABILITIES UN-LINE DEHUGGING AUTUMATIC TEST CASE GENEMATORS SIMULATORS OR DRIVERS (ADDED) BATCH DEBUGGING ALDS (ADDED) STANDARDS AUDITURS (ADDED) STANDARDS AUDITURS (ADDED) STANDARDS AUDITURS (ADDED) OTHER	111	YES		YES	S YES	s Yts	YES YES YES YES						
ALIDS HTER HTER TIES TIES NVEN	112	-			-		YES		C 0 2				
WENE ENS S S S ABILI ABDE (ADDE (ADDE S EMP)	113		YES	YE S		YES		YE 3					
SELE 1118 1048 ED) D)	114 1		•							J		N CN	
ECTED	115 1		C 0 3	YES YES	YES Y	X		*		C 0 2			
WHICH SUFTWARE TUDLS/AIDS WERE SELECTED FUR USE UN THIS PRUJECT? A. STRUCTURED PRE-COMPILENS B. AUTUMATIC FLOWCHARTERS C. LIBHARY MUNITORS C. LIBHARY MUNITORS D. MACHO PRUGHAMMING CAPABILITIES E. UN-LINE CAPABILITIES F. UN-LINE CAPABILITIES J. SIANDARDS AUDITURS (ADDED) J. SIANDARDS AUDITURS (ADDED) Y. NU SUFTWARE FOULS/AIUS EMPLIYED	189 119 111 111 111 111 111 111 111 111			ES YES	Y & S	YES	YES	yes					
nst use	7 116			s			တ					Š	
N T	6											NON NON	
2 X	120		YES							C 0 2			
13 160	121	YES			YES	YE S	Yt S						•
∞	22 12		=		Ξ		>	yt s					
	21 53		YES YES	YES	YES YES		YES	YFS			C 0 2		
	4 125		·0	so.	SYES	YES	YES	on.			a.		
	126	Yt s	YES	YES		Y							
	127			YES	YES								
	1.88.1		YES					>		ں			
	F1 67						¥.	YES		203		•	
	9						YES	7 7					

PART/SUB 201 202 203 204 205 206 207 206 209 210 01 A YES		209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 250 YES YES YES YES	2 912 512	17 218	2 619 Z	220 221 Yes	22 222	\$ 224 YES	445	226 G	2 1 2 2	28 229 YES	250
YES YES		YES		TES	YES				Yt S				
VE.S					<u> </u>	YES				_	YES		
VES VES VES		YŁ S			YES				\$ 1	Yts Y	res Y	TES TES TES TES	
VES YES YES YES YES		YES	YES YES YES	YES YES	re s	165	¥ 8	YES		Yt S Y	YES Y	YES	
YES YES YES YES		YES YES YES	YES YES Y	YES YES YES 1	1 S 1	YES YES YES		YES		YES Y	YES Y	YŁ S	YES
YES YES	-	YES	YES Y	YES YES									
003		•	C 0 2										
			C02										
NON							S C S	.					
HIO													

, •				
	130			YES
	\$			
	79			en .
			so.	res res
	2		YE S	YE
	126			
	55			
	24 1	rt s	YES	rt s
N S S T T T T T T T T T T T T T T T T T		>	>	YES Y
HUGHAMS HUGHAMS HULDS HHE FLUM INFUT HMS A ICALLY UN IZATION IZATION IZATION INFO HOD OR ION TIMES INC ON EACH HANCH INFO INFO INFO INFO INFO INFO INFO INFO	21.2			Y
TO DE THE TENT OF THE TOTAL THE TENT OF TH	189 110 111 111 111 111 111 111 111 111 11		'n	
CHARTMICK, 1977) CHARTMICK, 1977) CHARTMICK, 1977) CHARTMICK, 1977) CHARTMICK, 1977) OF MARIDIAS FUN COMPARE THE CODE OF ONE PROCKAM OF AND THE FOR CUDING ERHORS UNSANALYZE SOUNCE CODE CHARTING-SHOW THE LOGIC SIRUCTURE OF A PROCKAM CACHONION CENTERNORS—ITHANSLATES ASSEMBLY LANGUAGE PRO A MACHINE - INDEPENDENT MICHOPROCRAMING LANGUAGE AND BE MICKOPHOGRAMMING STATEMENTS INTO METWORKS TO ANALYZE IN A MACHINE - INDEPENDENT MICKOPHOGRAMMING LANGUAGE PRO A MACHINE - INDEPENDENT MICKOPHOGRAMMING TO BE FOR ALL LECTRESS PROUFS-ESTABLISMES THAT A GIVEN PROCKAM PERFOUNT ACTION AND HALTS ULIC GRAM EXECUTIONS—DECUMPANCE OF ALL INITIALIZATION ATTOMS AND HALTS ULIC GRAM EXECUTIONS—THE PERFORMANCE OF ALL INITIALIZATION ATTOMS AND HALTS ULIC GRAM EXECUTIONS—THE PREFORMANCE OF ALL INITIALIZATION ATTOMS AND HALTS ULIC GRAM EXECUTIONS—THE TOWNER THE POSSIBLE VALIANIES ATTOMS AND THE MODULES AND THAT CORRECT VALUES FON ALL ATTOMS AND THE MODULES AND EXHIBITED IN PRECISION IS ATTAIN ATTOMS AND THE MODULE AND TO THEIR POSSIBLE EXECUTION ATTOMS AND THE MODULE AND TO ESTABLISM THE EXECUTION THE AND MALAYSIS—THE LUNGEST AND SHORTEST PUSSIBLE EXECUTION AND MALAYSIS—THE MODULE AND TO IDENTIFY PUSSIBLE EXECUTION AND MALAYSIS—THE MODULE AND THEIR CORRECTNESS DEMONSTRATED BY CHAND EACH CLOSED—LOUP TEST CASE ARE CHECKED. THE BRE SALE DEMTIFIED AND THEIR CORRECTNESS DEMONSTRATED BY CASES ARE SOME AND SHALLION (ADDED) (ADDED) (ADDED) (ADDED) (ADDED) (ADDED)	21 0	_	YES YES	,_
NECES AT A LEEP A LONGE A LONG	120	YES	YES	YES
THE POLY SET TO	119			
TE SECOND TO THE	9			
O S A C T T T T T T T T T T T T T T T T T T	-			
NE SECTIONS TO SECTION OF THE SECTIO	=	~	' 0	~
A THE PER TANK OF THE PER THE	Ξ	YES	YES	YES
THE CODE OF ONE PROGRAM HOURS STRUCTURE OF A PROGRAM ANSLATES ASSEMBLY LANGG ANSLATES ASSEMBLY LANGG TOWNEDGRAMFING LANGUAGE TOWNEDGRAM PATHS TOWNEDGRAM THEST TO THEIR POSSIBLE TOWNEDGRAM THE TOWNEDGRAM TOWNEDGRAM TOWNEDGRAM TOWNEDGRAM TOWNEDGRAM TOWNEDGRAM TOWNEDGRAM TOWNEDGRAM THE THE THE EXECUTION TOWNEDGRAM TOWNEDGRAM TOWNEDGRAM THE THE THE THE THE TOWNEDGRAM THE	115			YE S
D TELET NATION OF THE PROPERTY	7			
DE TIPE LECEN CONSTRUCTION OF THE TOTAL OF T		YE S	YES	
TEST TOULS/IECHNIUUES/METHIUDS WERE SELECTED FOR UNSET COMPANIEDS, 1977) COMPANIATIONSUSED TO COMPARE THE CODE OF ONE PROCRAM VER COMPANIATIONSUSED TO COMPARE THE CODE OF ONE PROCRAM VER COMPANIATE FOR COUNTING A MALLY LE SOUNCE COUPE TENDED OF COUNTING STATEMENTS TO ANALY LE UNITO A MACHINEINDER THANSLATES ASSEMBLY LANGUAGE AND THE MICKOPHOLKAMMING STATEMENTS INTO NETWORKS TO ANALY LE PROCRAM STRUCTURE ANALY LESSON TO STATEMENTS T	2 1	F	>	
HARTMICK, 1977) HARTMICK, 1977) HARTMASUSED TO CONTROL OF ANDTHER FOUN CITY A MACHINEUSED TO CONTROL OF ANDTHER FOUN CITY A MACHINE-LINDEPROPERTY ILCHOPHOCKAMMING SHOULD ILCHOPHOCKAMING SHOULD ILCHOPHOCKAMMING SHOULD ILCHOPHOCKAMMING SHOULD ILCHOPHOCKAMMING	=			
TOTAL THE CALL THE TANK TOTAL	Ξ			YES YES
ORECTE CITORNO CICICALO CONTROL CALIFORNO CALI	110			YE S
CHARTELCE OF ANOTHE OF ANOTHE OF ANOTHE CHARTELLE A MACHINE A MACHINE A MACHINE A MACHINE A MACHINE A MACHINE A MACHINE A MACHINE A MACHINE CTNESS PA RED FUNCTI UCITE PROGRA RED TO DIS TATES TO DIS TATES TO DIS TATES TO DIS CHARTEL TO DIS TATES TO DIS CHARTEL TO DIS S ARE TO DIS S ARE TO DIS CHARTEL TO DIS S ARE TO DIS CASES SION OF REPLACE (ASSES)	60		YE S	
THE SI TOUCES COMPARATORS THAI UF ANDIR TOUR CHAUTHIE TOUR CHAUTHIE TOUR A MACHINI INTO A MACHINI TOUR CHURCH CORRECT NE SS CORRECT NE SS CORRECT NE SS CORRECT NE SS CORRECT NE SI THE MICROPHOUNE TOUR CORRECT CORRECT NE SI CORRECT	20		_	en .
THE TOTAL TO	7 10			S YE
12	9			YES
\$	106			YE S
	105		YE 3	YES
	MESPONDOR 101 102 103 104 105 106 107			
	63			YES
	HESPONDOR 101 102 1		ø	>
	3P.04	ø	4	20
•	¥ 0	YE		YES
201	308	<	Ð	J
20 T 1 0 W	PART/3UB	-	5	5
3	Ž			

77

YES. YES.

YES YES

9 10

01 **f**

YES YES YES

YES YES

Yt S

res ves ves

, £ S

YES

YES

14.5	76.9		-	YES YES	<u>د</u> و		න අ	YES	>	Yt s		3	¥ £ \$		= ;	7ES		YES	s		YES		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	TES TES	S YES YE		r ≺ ≺	بر در در			7 t 8	>	£ S	7.		20 A	>	Es TE	en en		7.	s Yts		Y Y Y		
14.	=	S YES YE		ES T	r S				>-	E S	¥	SYES	YES		ž	SYES		res Ye	တ		YES		
Cu2 Cu2 Cu2 Cu2 Cu2 Cu2 Cu2 Cu2	=			r. S. Y	ES	76.5	YES	YES	>	t s		YES			7	en en	YES	IES YE	တ		YE S		
100					C 0 2																		
044 120			503							ت	~0			200						C 0 3		200	
OH COR TES									ОТН														
YES YES <th>= ..</th> <th>RESPUNDOR 201 202 20</th> <th>3 204 2</th> <th>05.2</th> <th>06 207</th> <th></th> <th>9 210</th> <th>211</th> <th>212 2</th> <th>13.2</th> <th>14 21</th> <th>5 216</th> <th>217</th> <th>218 2</th> <th>19 22</th> <th>122 03</th> <th>555</th> <th>25 22</th> <th>4 225</th> <th>978</th> <th>227 20</th> <th>58 224</th> <th>250</th>	= . .	RESPUNDOR 201 202 20	3 204 2	05.2	06 207		9 210	211	212 2	13.2	14 21	5 216	217	218 2	19 22	122 03	555	25 22	4 225	978	227 20	58 224	250
1.65 1.65 <th< td=""><th></th><td></td><td>></td><td>£ 3</td><td></td><td></td><td></td><td>Yt. S</td><td></td><td></td><td>7</td><td>SYES</td><td></td><td></td><td>¥</td><td>øj.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>			>	£ 3				Yt. S			7	SYES			¥	øj.							
YES YES <th></th> <td></td> <td></td> <td>></td> <td>E S</td> <td></td> <td>YES</td> <td></td> <td>Yt. S</td> <td>F</td> <td>: S YE</td> <td>S YES</td> <td></td> <td></td> <td>7.</td> <td>SYES</td> <td></td> <td></td> <td></td> <td>YE S</td> <td></td> <td>YES</td> <td></td>				>	E S		YES		Yt. S	F	: S YE	S YES			7.	SYES				YE S		YES	
YES YES <th></th> <td>YE:</td> <td>S YES Y</td> <td>ESY</td> <td>83</td> <td></td> <td>YES</td> <td>Yt S</td> <td>YES</td> <td>S</td> <td>¥</td> <td>SYES</td> <td>YES</td> <td>YES Y</td> <td>ES YE</td> <td>SYES</td> <td></td> <td></td> <td>YES</td> <td></td> <td>7</td> <td>S YES</td> <td>Yt S</td>		YE:	S YES Y	ESY	83		YES	Yt S	YES	S	¥	SYES	YES	YES Y	ES YE	SYES			YES		7	S YES	Yt S
YES YES <th></th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>YES</td> <td></td>								YES															
YES YES <th></th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>YES</td> <td></td>									YES														
YES YES <th></th> <td></td> <td></td> <td>F</td> <td>ES YES</td> <td></td> <td></td> <td>YES</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>YES</td> <td>YE</td> <td>n</td> <td>YES 1</td> <td>t S</td> <td></td> <td></td> <td></td> <td></td> <td></td>				F	ES YES			YES						YES	YE	n	YES 1	t S					
YES			YES	×	ES YES			YE S		¥	S			YES	YE	s)	YES	r s					
YES				F	9		S YES			Ξ	ø,	YE S	YE S	YES Y	E S		YE 3 Y		ဘ			YES	
VES				F	ES YES		3 YES	Yt s	>-	ES YI	S YE	SYES	YES	YES Y	ES YE	s	YESY	t s		YES	*	s)	
CO2 CO2			YE S	×	so.		ø,	rts				YES		Y 6 9			Yt S	Yt	on,				
02 UNK						00	C4					C 0 5								Ū	703		
		COZ UNK																					

OUE STION		15	- ō ×	F YOH	IF YOU HAD TUTAL CONTRUL OF THE PLANNING FUNCTION WITHIN YOUR OHGANIZATION, OK WEKE ABLE TO INITIATE RESEARCH INTO HOW TO IMPROVE THE PLANNING FUNCTION, WHAT ACTIONS WOULD YOU TAKE?	U 10 10N, 1NG	TAL COK F	CONTH VEKE 110N,	ABLE MMA	10 TO 11	te Pt. IN17 I110N	ANNII IATE S WON	NG FI RFSI ULU J	JACT FARCT	ION I	A1 141 70 HE	7 K	1 K	KUVE								
PART/SUB	/SUB	HESPUNDUM 101 102 103 104 105 106 107 108	5 106	107	106	F 0 4	110	Ξ	112	113	1.	109 110 111 112 113 114 115 116 117 118 119 120 121 122 124 125 126 121 128 129 130	91	117 1	9 -	- 511	20 1	1 17	22 1,	es 1.	3.4 P.S	51 S	\$1 93	1 12	21.8	<u> </u>	0
5	100 10	PHE MIS PRD MIS PSD CIA PBB MI	U CIA	9 8 8	SIM C	P 4C	P4C MIS MIS	MIS	XXX	P 3.A	S I M	XKA P3A MIS P3A MIS	- SIN	4 0 Ho	1 956	192	115	15H H	PRU P5G PBB MIS USH MIS MIS PIY PSF MIS P8B	3 51	17 P.	SF H.	8 - 8	2 I	¥	A X 7 A	4
0	700 10			744					XKE	a .		Pot													990	9	
0	01 003			940	_				H			P 84															
6	#00 10			PIE																							
-	500			P 1 G	,_																						
PAH 1/8UB	AUS/	HESPONDOR 201 202 203 204 205 206 207 20	5 206	207	7 208	209	210	211	212	215	214	209 210 211 212 215 214 215 216 217 218 219 220 221 222 223 224 225 224 217 218 219 230	216	217	218	, 615	2 02	2 12:	2 2 2	28.2	24.2	55. 25	27 9;	7 22	, , , , , , , , , , , , , , , , , , ,	4 23	9
5	100 10	MIS MIS PEC DEA MIS MIS N/A PRU	S MIS	X / X	980	X 9 P	X9P MIS PSB	PSB	P 1 A	2	X7B	PIA NIJ X78 S28 PSH SIC D2C OZA MIS PIC CSG SIC X9F MIS PIU MIS	FSH.	1 218	020	1 YZ0	418	2 21,	86.8	X 21	X 35	S F	U MI	S PB	PBB PRD X4A	a X	⋖_
5	01 005	P10			T X			PoB	X 1 B	X1F	X70 P8J	P8.					•	PRA CSC		08C				D&X	3		
6	01 003								CVB	X 10														CWC	ິນ		
6	700								CIC																		
-	500 10								X 1 E																		

IF II WENE IN YOUM POWEN IO MAKE CHANGES IN THE MAY TECHNICAL DECISIONS ARE MADE CONCERNING PROGRAMMING TECHNIQUES, TEST PROCEDURES, DUCUMENTATION STANDANDS, EIC., MHAT ACTION MOULD YOU TAKE?	RESPUNDOR 101 102 103 104 105 106 107 106 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	NIS MIS PBE 040 XHB UIN UTE XHB X7C MIS MIS	389	₹ X	209 219 215 215 215 215 215 215 225 255 125 025 215 215 215 215 216 217 215 215 216 219 219	X9L X9M DIA P5H NON X7C U2B MIS X7B CSD XKC D3A MIS CSE	016 06E X7C			
IF II WENE IN YOUM FOWEN IN DECISIONS ARE MADE CONCENN PROCEDURES, DUCUMENTATION YOU TAKE?	105 10c 107 10b 109 110 111 112	XKB MIS MIS XUL	XKD		205 206 207 208 209 210 211 212 3	HIS MIS X7C CIA KON MIS KOK 35A K9L	X90 CSH H38 U5C	258 812	350	154
GUESTION S2	RESPONDON PANT/SUB 101 102 103 104 10	01 001 X98 MIS X9A MIS CSI X7C XKB MIS	01 002 РІН	01 003	KESPONDOR PAHT/SUB 201 202 203 204 205 206 207 208	OI COI MIS MIS XOC CSA MIS	01 002 CSC	01 00 5	700 10	01 005

PART/SUB 01 A	53	0 1 F 0 3 F 0	14 105 Yes	E S 100 S AFES	10 WHICCI B. A L C. A S. C. C. OTH. C. C. OTH. C		TE COL	AS A	H HKST ASSIGNEUS NE UNGANIZATION NE UNGANIZATION NE UNGANIZATION GER (UN NO SENI AFF ONGANIZATIO AFF ONGANIZAT	NO UND ON	THE	HE FILE	CH DRGANIZATION WITHIN THE FIRM WAS THIS SOFTWARE DEVELUPMENT T FIRST ASSIGNED: LINE ORGANIZATION UNDER THE AUTHORITY OF THE SENIOR ADP NACER (OR NO SENIOR ADP MANAGER) (ADDED) STAFF ORGANIZATION UNDER THE AUTHORITY OF THE SENIOR ADP NACER (OR NO SENIOR ADP MANAGER) (ADDED) STAFF ORGANIZATION OUTSIDE THE AUTHORITY OF THE SENIOR ADP NACER (OR NO SENIOR ADP MANAGER) (ADDED) 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 TES YES YES YES COS COS COS YES YES YESS	A POPE A	12 CO	UF INE STATE	SENIOR HE SENIOR HE SENIOR THE SE	ADF ON AD TUR 121	VELUPMEN ADP MANA ADP MAN OR ADP 121 122 YES YES	1 6ER AGER 123 1	124 125 Yes yes	25 12 YE S		127 128 129 Yes yes yes	129 YES	1 30
01 C		C 0 3	ĸ.												YES											700
0 10							YES													rts						
PART/SUB	KESPONDOR 201 202 203 204 205 206 207	13 20	4 205	5 204	5 207		509	210	2112	112 2	13 4	14 21	208 204 210 211 212 213 214 215 216 217 218 219 220 251 252 253 254 255 256 221 228 239	6 21	7 216	612 8	220	221	222	223 6	24.2	52 55	26 22	7 228	224	630
V V 10	YES	YES	ຶ	C 0 3		C 0 4	CO4 YES		YES YES	S					YE 9	YES YES			003		>	YES	X	YES YES		YES
3 2	YES		YES	Ø	C 0 3			YES		>	ES	ES YE	YES YES YES YES	S YE	ø		C 0 3	CO3 YES		-	YE S	C03	~		YES	
) IO																				YES						
0 10	003	2														:										

	90	7		20	S				
	 	S		N S	S				
	2 8	s YE		8 25	SYE				
	1 12	YES YES CO4		7 22	4 YE				
	21 0	YE		25	000				
	126		YES	550	YES				
	521	YES		552	YES YES YES CO4 YES YES YES				
=	124	YES		754	YES				
2066 H	123	YES		223				YES	
HE DE TO THE TO	121	16.5		222	C 0 4				
S ICT IT I I I I I I I I I I I I I I I I	121	YES		221	YES				
INI ILAB ILOR ILOR NIUR SENI	120	YE S		220	003				
THE SHE SEN	611	YES YES YES YES YES YES		513	YES CO3 YES CO4				
WHICH OHLAMIZATION WAS RESPONSIBLE FOR DETERMINING THE INITIAL BUDGET, DELIVERY SCHEDULE, RESOURCE REGULERMENTS, COMPUTER AVAILABILITY, ETC., (FOR SUPTIMAE)? (ADDED) A. THE ONCANIZATION TO WHICH THE PROJECT WAS INITIALLY ASSIGNED B. A LIME ORGANIZATION OUTSIDE THE AUTHORITY OF THE SENIOR ADP MANAGER C. A LINE ORGANIZATION OUTSIDE THE AUTHORITY OF THE SENIOR ADP MANAGER COR NO SENIOR ADP MANAGER) (ADDED) D. A STAFF ORGANIZATION OUTSIDE THE AUTHORITY OF THE SENIOR ADP MANAGER COR NO SENIOR ADP MANAGER) (ADDED) L. A STAFF ORGANIZATION OUTSIDE THE AUTHORITY OF THE SENIOR ADP MANAGER COR NO SENIOR ADP MANAGER) (ADDED)	9	•	003	9	-		Yt S		
LAND LAND LAND TITY (LITY (ED)	11	i.s	•	11.	\$ 1,				
H DHEANIZATION WAS RESPONSIBLE FOR DETERMINATE SCHOOLE, RESUDECT REQUIREMENTS, COMPRISHED THE DECAMENT THE ORGANIZATION TO WHICH THE PROJECT WAS A LINE ORGANIZATION OUNDER THE AUTHORITY OF A LINE ORGANIZATION OUNDER THE AUTHORITY OF MANAGER (OR NO SENIOR ADP MANAGER) (ADDED) A STAFF ORGANIZATION OUTSIDE THE AUTHORITY UNANAGER (ORGANIZATION OUTSIDE THE AUTHORITY OUTSIDE.	•	10		91.	YES YES YES YES				
ROJE ROJE UTHE EK) AUITHE F AUITHE	15 1	اد اد د		15 2	£3 Y				
HIE PHE PHE PHE PHE PHE PHE PHE PHE PHE PH	= -	× ×		14 2	E S 7				
NSI KH KH CA CA CA CA CA CA CA CA CA CA CA CA CA	1 5 1	8		5 51	. s				
HESPE WELL WOUTS WALL WALL WALL WALL WALL WALL WALL WAL	~	3		~ ~	*				YES
ENICA ENICA	=	S		1 21		တ			¥.
C	= 0	S YE		0 21		YES YES			
ACANIZATION MASS "WORLDLE, KESO "WARE DUE DO ONCANIZATION TO ONCANIZATION INE ONCANIZATION INE ONCANIZATION INE OCCANIZATION INC O	= 6	3 76		9 21	271	¥			
THE CONTRACTOR TO THE CONTRACTOR TO THE CONTRACTOR	01	3 46.		20	ı YE				
VERY SCH VERY SCH THE ORGANI THE ORGANI THE ORGANI THE ORGANIA THE SCHAFFE THE	100	YES		507	703				
UPPLIVE OF CFOR SECTION SECTIO	101	7 5		207	YES YES COU YES				
830480 0T 4	106	YES		206	YES				
	105	YES		205					YŁ S
	104	YE S		204	YES				
	RESPONDOM 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	CO3 YES		RESPUNDOR 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230	YES YES COB YES				
	0000 102	YE S		UNDC 202	YES				
3	RESPONDOM 101 102 1	C 0 3		RESPUNDOR 201 202 20	YES				
	R _O								
eue st Lon	PAHT/SUB	4 10	01 E	PANT/SUB	V 10	=) IO	0 1 0	0 F
2	ď	-		PA	-	-	-	-	

	9			တ	0	'n		
	-	'n		7 t S	6 24	YES YES	~	
	2 2	S YE			22 8	¥ F	C 0 3	
	12	1 YE			1 22	7 £ 3		_
	15	YES YES YES YES			221			YES
	126	YES	YES		526	Yt s		
	125		ACB		558	7 t 3		
4	124	re s			224	YES		
	123	YES			223	COI YES CO3 YES YES YES YES		
HE UNE	122	Yt s			222	C 0 3		YES
NC I	121	800		Yt S	221	Yt S		
MINI ES NA SSIG	120	YES			220	C 0 1		
ETEN DURC CGIV	2	rt s			5		YES	
N N N N N N N N N N N N N N N N N N N	8	14.8			813	YES		
16.8 1	17	£ 8 1			11	E 3		
IS PROJECT WAS INITIALLY ASSIGNED: ULTIMATE PROJECT MANAGER PARTICIPATES IN DETERMINING THE EDULE, BUDGET FIGURES, ETC. PLANNING, HUDGETING, AND ALDCATION OF RESOUNCES WAS DONE BY CIAL STAFF ESTABLISHED FOR THIS FUNCTION. (GIVE NAME) AD HOC GROUP WAS SET UP TO HANDLE THE INITIAL ASSIGNMENT UNTIL EMMANENT GROUP WAS ESTABLISHED	18 109 110 111 112 113 114 115 116 117 118 119 120 121 125 124 125 126 127 128 129 130	S YES YES YES COS YES YES YES YES YES YES YES YES COS YES YES YES	YE S		91	YES YES YES YES YES		
S PROJECT WAS INITIALLY ASSIGNEDS ULTIMATE PRUJECT MANGER PARFICIP ULCE, AUDGET FIGURES, ETC. PLANNING, HUDGETING, AND ALLDCATI TAL STAFF ESTANLISHED FOR THIS FU O HOC GROUP WAS SET UP TO HANDLE KMANENI GROUP WAS ESTANLISHED	1 51	£S T	>		2 5	£ 3 ≺		
A PAS TC. DAL UR TC.	1 41	ES Y			14 2	ES Y		
S PROJECT WAS INITIALLY ASSIGN ULTIMALE PHOJECT MANAGER PARTE ULCE, BUDGET FIGURES, ETC. PLANNING, HUDGETING, AND ALLOC LAL STAFF ESTAHLISHED FUR THIS D HOC GROUP WAS SET UP TO HAND HMANENI GROUP WAS ESTAHLISHED	13 1	₹			13 2	S		
MAN	7	3 X X			2 2	Ξ		S
DECTORE THE TENT OF THE	=	၁၁			~	တ		YES
1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	=======================================	S YE			0 21	YES YES YES		
NA PER Na Ber Na Ber Caran	= -	. Y			9 21	S YE		
ULTE DULE PLAN TIAL TO HO TENT	01 8	3 76			9 20	3 YE		
STATE OF STA	01 -	7.			707	ı ve:	,	
A. THE SCHE SPEC	RESPONDUR 101 102 103 104 105 106 107 10	YES YES YES YES YES YES YE			201	YES YES CO3 YES YES YES YES YE		
E	9	YES			206	YE 3		
	105	YES			205	Y E S	C 0 3	
	104	YES			204	YE 3		
	£0 10 3	YE S			7R 203	C 0 3	C 0 3	
	HESPONDUR 101 102 1	1 E S			HESPONDOR 201 202 20	YE 3		
\$5	RESP 101	74.8			HESPONDOM 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 250	YES		
	808	<	Ð	u	SUB	<	•	u
QUESTION	PART/SUB	V 10	0 1	0 C	PART/SUB	5	5	6
9	<u>a</u> .				مَ			

î

NON NON	HESPONDOH 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 2	YES VES YES YES YES YES YES	YES	YES YES YES
	04 205 206 207 208 209 210 211 212 213 214 215 216 217 218 2	YES YES YES YES	YES YES YES YES YES YES	
NON	S 206 207 208 209 210 211 212 213 214 215 216 217 218 2	S YES YES	YES YES YES YES YES YES	
**************************************	06 207 208 209 210 211 212 213 214 215 216 217 218 2	S YES YES	9 YES YES YES YES	
	77 208 209 210 211 212 213 214 215 216 217 218 2	S YES YES	9 YES YES YES YES	
	18 209 210 211 212 213 214 215 216 217 218 2	S YES YES	9 YES YES YES YES	
	9 210 211 212 213 214 215 216 217 218 2	YES	YES YES YES YES	
	0 211 212 213 214 215 216 217 218 2		YES YES YES YES	
	8 13 213 512 512 518 518 5			
	815 715 915 517 518 5	76.5		
	214 215 216 217 218 2	76.5		YES
	215 216 217 218 2	YES		YES
	216 217 218 2	YES		YES
	217 218 2	Yt S	YES YES	YES
	218 2		YES YES	YES
			l S	
	7 61	>		
	20 S	E S	-	
	21 22		1 8 YE	
	25 25		.s. YE	
	3 224		S YE!	
	572 1		YES	
	326		71.8	
S + 1 × 1	727		YE S	
	228	YES		
	628	YES		
	79 II	YES 220 221 222 223 224 225 226 227 228 229 23	YES 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 227 228 229 230 YES YES YES YES	YES 221 222 223 224 225 226 227 228 229 23 YES YES YES YES YES

QUESTION	56		STHI NI	-	PROJECTA	11	N AMON	Ø. ₹	2	PROJECTA Bare Deutscher Bas Handled Wilhim Inf Add Freihere Edit	[I]	Z .	4	2	2	2	3							
		-	1 <u>~</u> *	FUNCTI	CNAL	ANA C	TIONAL ANALYSIS ON PROSPECTION TO THE DEVIL DEMENT TEAM	2 2 2	4803	TIONAL ANALYSIS OF PROSPECTIVE USERS SELNG ASSIGNED OF	180	33	INC.	A 3 S 1	GNED	ž								
			E	AUP SP	, c 1 A	1817	N. H.		AILE	SPECIALISTS WENE DETAILED OF ASSIGNED TO THE FUNCTIONAL USER	ASSIG	NED	5 H	t 10	NC I	UNAL	USER							
		J	<u>ۃ</u> د	108 - 1	INC DE	- W W W W W W W W W W W W W W W W W W W	USER	F F F	CYFU	CAT DUMATION OF THE DEVELOPMENT EFFORT FUNCTIONAL USEK EMPLOYFU "ANALYSIS" WHO DEVELUPED SPLCS.,	NI EF ⊑Y8TS	Į.	0 10£ V	t L UP	£0 S	PLCS.								
			تقا	DE STEN	GNS, A	LGOR	THMS	E 1 C	E 0	DESIGNS, ALGORITHMS, ETC., WHICH WERE THEN PRESENTED TO THE	at Rt	THEN	PRES	FNIF	= 0	±								
		J	i.	THE AU	3	NC 11C	N N	DON	بر <u>.</u>	ADP FUNCTION WAS DONE HY THE FUNCTIONAL ANALYST/USEM (1.4. ADP	FUNCE	N O	ANA	LYST	/ust	Ξ.	t . A(÷						
				-	A T	SEPA	ATE !	UNCI	10N)	NUT A SEPAHATE FUNCTION) (AUDED)	£0)													
		4	- i	THE FU	1 T	ONAL	ANAL	218	SAN	FUNCTIONAL ANALYSIS WAS DONE BY THE ADP PERSONNEL (1.6. THERE NOT A SEDANATE LISED ANALYSIS) (ADDED)	H	10 F	3 3	SCIN	ינו	. .	Z Z							
	٠.	7 7	, z	_	H H	t ABC	OF THE ABOVE (ADDED)	unde D		•		3												
100	RESPONDOR	30.				•	:	:			:			•	•				,	;		;	;	
						2	-	-	-	051 621 021 731 031 631 631 631 631 161 161 161 161 161 1	-		-	<u>-</u>	-	71	, I E	77 (69	9	/ / /	92	- -	_
V 10	YES	YES YES	S YES YES	YES		YES Y	YES YES	S YES	σ			YŁ S	>	YES		YŁ S	σs	YES	YES YES		Yt S	>	res res	_
9 10					YES						Yt s				ī	YES								
01 C	CO3 YES C	C04							YES	yn.			YES							YES		YES		
01 E										C 04				Ü	C 0 3		C 0 S							
	gonna 10																							
PART/3UB		204 205 206	b 207	20	508	210 2	11 21	2 21	3 210	209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 226 221 228 229 230	912	217	218 2	2 6 F	20 2	77 17	2 223	1 224	577	477	227	2 8 2	5 62	
V 10	-	YES YES	ω				YES	တ				YE S			ĭ	ts Yt	TES YES YES		YES		Yt S	>	YE S	
01 8	YES		YES	YES YES	•	YE S														YES				
01 C	YES	YES			YES	-	YES	*	3 YE!	YES YES YES YES	YES	_	YES YES	27				YES						
0 10	603													ت	€03									
01 E																					J	C 0 2	C 0 2	
V 10	C 0 2																							

85

	MESPUNDON PART/SUB 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 124 125 126 127 12B 129 130	01 001 CFU 034 CFU 019 015 030 010 MIS 015 020 017 012 020 025 MIS MIS 040 005 002 100 008 066 150 275 004 MIS 015 CFU 100 006	KESPONDOH Paht/Sub 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 223 224 225 227 228 229 230	024 010 CFU MIS 015 003 020 MIS 020 010 010 010 005 MIS 008 030 MIS 010 MIS 052 050 100
£03	123	1 50	223	900
(AUDED)	122	990	777	S E
PUSITIONS (FILLED & UNFILLED) SUPPORTED THE PROJECT?	121	800	521	\$00
7403	120	100	220	010
I HE	119	005	519	010
140	9	00	218	010
X O A A	117	040	217	070
ns c	911	S I E	216	N S
11.60	115	SIN	215	050
UNF	7.	570	214	003
*	113	070	213	015
111	112	210	212	M I S
S (F	Ξ	017	211	CFU
110N	110	050	510	010
Pusi	109	1 0 1	\$0.2 50.2	024
Y N Y	108	N 18	208	080
HOW HAND	107	010	201	610
•	701	0 3 0	506	090
	105	910	202	010
	0 1 1	510 (504	0 40
	90K	CFL	20 S	011
	RESPONDOR 101 102 10	1 034	KESPONDOR 201 202 20	7
55	101	CFL	RE 3	0.25
UVESTION 59	PART/3UB	100 10	PART/SUB	01 001 025 MIS 011 040 010 060 011 080

	0.0	SD .			3	ø	
	, =	Ξ 2			ચ ક	2 1	
	9 19	YES YES YES YES			8 22	SYE	
	71 15	SYE			27 1	SYE	
	2	YE			72	YE	
	771			¥	777	YES	
	125	¥ + 8			525	YES	
يد د	124	YES			224	YES	
T AUE C AUE	123	YES			223	C 0 3	
E E S	122	YES			222	YES	
E FAC	171	¥ 5			177	YES	
EAMS 12A1 RSUN	120	YES			220	YES	
LO T KGAN t -Pt	119	YES			615	YES	
2 2 4 2 2 8	9118	YES			218	Y E.S	
AOJE HAV	117	11.8			113	L S	
20	91	It S			918	(E.S.	
(SOFTWAKE) PROJECT UNGANIZATION DISTORD INTO TEAMS EACH HEADED HNICAL LEADEN? NOTE: IN A SMALL PROJECT UNGANIZATION WITH ACTIVITIES IT WOULD BE POSSIBLE TO MAVE ONE-PERSON TEAMS (ADDER NI	8 109 110 111 112 113 114 115 117 118 119 120 121 125 123 124 125 121 111 111 130	YES			209 210 211 212 213 214 215 216 217 218 219 220 255 255 255 25 218 217 218 217 218 219 250	YES	
N 1 Z	3	83			3	1.5	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	13.1	F.S. 7			13 2	ES Y	
NOT NOT COLLE	1 21	£ S 4			7 71	F 35	
FR03	=	F 8			7	YES Y	
HE) LEAU	0	ES X			2 01	>	YES
TAL I	1 60	5			2 60	YE S	-
(SOF	2 9	ø			10	:0	
THE TECHNICOMP	7 10	¥	s		7 20	S YE	
MAS THE (SOFT BY A TECHNICA DIVENSE ACTIVA A. TÉS B. NU Z. COMMENT	MESPUNDUR 101 102 103 104 105 106 107 10	s	YES		KESPUNDON 201 202 203 204 205 206 207 20	YES YES YE	
	91 9	YES YES YES YES YES			5 20	YE	s
	01	S KE			50,	~	YES
	01 1	¥E!			50%	YES YES CO3 YES	
	30.	44.5			96 203	C03	
	HESPONDOR 101 102 1	¥ 5			HESPUNDON 201 202 2	YES	
4	HF S	YES				YES	
BURSTION BO	3UB	<	20	×	PAR1/8UB	⋖	=
2 S	PAHT/3UB	4 10	9 10	× 10	AR17	4 10	9 10
ā	ã				a.		

																	;	•								
00E ST 1 DR	-		<u>\$</u>		TYPES UP THE COMBINED OF THE C	A STATE OF THE STA	PES UF TEAMS WERE EMPLO- UF THIS QUESTION AN ENG- INED (FUNCTIONAL) ANALY: HATE SUFTWARE (APPLICATIONALE PROGRAMME TEAM HATE TEST TEAM HATE INTERACTION TEAM HATE INTERACTION TEAM HATE THUDUCT ACCEPTANCE NUT EMPLOY TEAMS	TEAN TEAN TEAN TEAN TEAN TEAN TEAN TEAN	MERT E MILON AN MER TERPE MER TERPE MILON TE MET TERPE MET TERPE M	INTERMS WERE EMPLOYED IN SUPTIMENT DEVELORMENT TOR THE TRIBE SOUESTION AN ENGINEER IS CONSIDERED AN ANALYSI) (ADDED) OF FUNCTIONAL) ANALYSIS—FRUGHAMER TEAM (ADDED) OF FUNCTHAMER TEAM (ADDED) OF FUNCTHAMER TEAM (ADDED) OF THE TEAM (ADDED) OF THE TEAM (ADDED) OF THE TEAM (ADDED) OF THE THEORY TEAM (ADDED) OF THE THEORY TEAM (ADDED) OF THE THEORY TEAMS (ADDED) OF THE THEORY TEAMS	TEU IN SUFINA SIS-PRUGRAMME: IUN) ANALYSIS TEAM (AUDEU)	H IS OF THE SERVICE ANALY	SUFINANE IS CUNSIDE UGHAMMER I VALYSIS 'E (AUDEU)	IEVELOFMEN DERED AN ANA TEAM (ADDED) TEAM (ADDED)	A C A C A C A C A C A C A C A C A C A C	LUFMENT AN ANAL AUDEU)	DEVELOPMENT CTOK THE KED AN ANALYST) (ADD ED) AM (ADDED) AM (ADDED)	- C - C - C - C - C - C - C - C - C - C	(a 14							
PART/SUB	KESPUNDUK 101 102 103 104 105 106 107 10	01 10	901 5	101	108		011 601	Ξ	112 1	113 114 115 116 117	7	11 S	113	81	2	120	221 120 150 1811	122	123	124	123 124 125 126 127 128	7 97	27 1.5	16 12	129 130	9
¥ 10	YES YES YES Y	YES YES	SYES		YES	76.8	YES	YES	YES Y	YES YI	YES YES	S YES	SYES	71.5		YES	rt S	Yt S	003	YES		⋝	YES YI	res res	SYES	တ
								_	YE.S							YES			YES	YES			Z	YES		
01 C	YES														YES				Yts				Ξ	YES		
0 10		YE 9						rt s				YE S	S YES	_		yes	27 7	2 4 2	YES	YES			Ξ	YES		
01 E	YES							YES				YES	s YES					YES	YES	YES	Yt S		Ξ	YŁS		
01 F													YE S	_						YE.S			F	YkS		
3 10																			203							
x 10				MIS																	I	M I S				50
7 10																בום			UTH H		•				5	HIO
PAR1/SUB	KESPUNDOR 201 202 203 204 205 206 207	07 50	2 204	207	208	209	210	211	212 3	213 2	214 215	5 216	6 217	7 218	219	220	221	222	223	224	225 2	236 2	227 2	622 822	9 230	9
V 10	YES YES CO3 Y	YES	YES	YES	YES			YES				YES	so.	YES		YES	Yts	YES	C 0 3	YES	>	YES Y	YES YE	3 3	ĭ	rt s
9 1 6	603					YES					Yt S	SYES	¥	S)	YES									¥	YES	
01 C								_	YES 1	YES Y	YES YES	SYES	ဟ		YES						YES			YES	S	
0 10	•	YES	Yt. S	_	YES	YES				YES YI	YES YES	SYES	SYES	YES							Yt S			00	~	
01 E		YES	YES		YES	YES			YŁ S			YES	SYES	S YES	YES						YES Y	Yt S		YES.	'n	
1 10					YES				Yt.S			YES	'n								7 t S					
9												703	~													
¥ 10		NON	z				S																		NON	z
7 10																						=	H CO			

		1 30	YES	Yt S						2 50	YE S	YŁS					
		621	YES	YES	YE S					554	y E.S	YES					
		28	YES	YES						82	_	ES					
			YES Y	>	YES					5 15	YES	YES YES	Yt S				
		9	>		F			N S I		2 92	>	YES	YESY				
		<u>ئ</u> ب	ဘ	'n				I		2 5	n	S	Ž				
		4 12	S YES	s YES						4 22	S YES	SYES					
		s 12	s Yts	s yts	'n	3 0	24			3 22	s yt s	S YES	'n				
		71	YES	rts	YES	700	₹0 0			77	YES	YES	YES				
		123	11.5	Yt S						22.5	YES YES	YES YES YES	Yt S				
DEC.	_	121	YES YES	YES	YES					221		YES					
PROJECI	JJE C	120	YES	YES	YES					520	YES	YŁ S	YES				
10 TA	ž.	119							NON	219	YES	YŁ S					
2	Ī	911	YES	Yt. S						818 755 855 855 855 855 155 857 858 858	YES	YES	YES				
THE FOLLOWING FUNCTIONS WERE INTERNAL T UKGANIZATION? ISTRATION CI CUNTHOL AM SUPPONT LIBRARIAN CI/OUGLIY ASSURANCE (ADDED) CERVATION MANAGEMENT (ADDED)	WENE INTEGRAL IN THE PROJEC	113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129			YES								rts				
3	CKA	9						N IS		210 211 212 213 214 215 216 217	YES	YES YES	YES YES				
# 6 ₀	T T	1 5 1	YES	Yt S				•		15 5	YES 1	YES	YES Y	C 0 2	C 0 5	NON	
NS ME KE	3 3 3	141	YES Y	YES Y						2 21	>	YES Y	YES Y	J	ن	z	
THE FOLLOWING FUNCTIONS WERNI UKGANIZATION? NISTRATION ECT CUNTRUL NAM SUPPURT LIBRARIAN UCT/JUUALITY ASSURANCE (ADDED)	سي	13.1	¥	F					¥0.¥	13 2		YES Y	YES Y				
IUN? IUN? LIBHARIAN ASSURANCE	UNCTIONS OF THIS TYPE GEMENT OMGANIZATION RS	112 1	a,	ø					ž	~		F	¥			z	
NC P 10N7 10N7 10N7 10N7 10N7 NAGE	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	=	S YES	S YES	ø					1 21	93	'n	ဘ			NON	
LOWI 12A1 UN HOL UNI	KEAN		YES	s Yts	S YES					0 21	7.	SYES	s Yts				
THE FOLLOWING POLLOWING POLLOWS IN THE STATION FECT CUNTRUL FIRM SUPPORT LIBRATION MANAGE	SACI	100 110 111	' A	* YE S	YE S					21.0	3 YES	3 YES	3 YES				
NI OF	CENE E SENE	9	YES	YES						506	Y £ 3	YES	YES			_	
	NO FU MANAGO OTHER	9	YES	YES						208						NON	
2 4		101	YES YES YES	Yt 3						207	YES	YES	YES YES				
1 4 5 0 0 m	× 7	106	YES	YES YES						206		YES	YES				
		RESPONDON 101 102 103 104 105 106 107	YES	YES	YŁ S					204 205 206 207	res						
		104								204	¥ E 8	YES					
		202	YE S	YES	YES YES					203						C 0 3	
1		0 S 0 1	S							000	YES	11.3	128				
7		RESPONDOR	YES YES YES	YES YES	YES YES					RESPUNDOR 201 202 203	YES 1	YES YES	TES TES	203	C 0 2		
		_	~	~	~						-	~	-	Ų	J		
uut		PAKT/SUB	٧ -	33) I	0 1	1	×	-	PART/SUB	⋖ ••	9	J (0	w	>	
100 m		Y X	•	5	5	-	2	•	0	PAR	9	5	0	-	5	6	

ULESTION 6'S	7	`		A 4	MHCM 014 010 010	TO WHOM DID THE TEST TEAM MEPURI? A. THE PROJECT MANAGEM B. OTHER THAN PROJECT MANAGEM (ADDED) Y. DID NUT EMPLOY A (SEPARATE) TEST TEAM (ADDED) Z. OTHER	JEC	TES MAN PROJE	1 16 AGEN ECT 1 A CS	AN HE	: PUR]	I? (AUDE FEST	60.	<u>\$</u>	But D												
PART/SUB	MESPUNDOR 101 102 103 104 105 106 107	104 1	1 50	1 90		108 109 110 111 112 113 114 115 110 117 118 119 120 121 124 129 120 121 118 129 130	- *0	1 0 1	-	~	13 11	=	15 11		11 /	=	120	121	122	123	124	125	1 26	127	821	5.5	\$0
A 10	YES	YES	~	YES		-	YES YES YES	£ 8 Y	E S	Ξ	Yt S	7	YES	ند حر	YES TES	ر دن	0	YES	YES	74.8	COS YES YES YES YES YES	¥ 5			_	YES	
9 10		J	700										C 0 2	~											700		
x 10																							37 H				
01 ۲	NON NON			Z	NON NON	Z S Z			Ž	NON	ž	NON				NON	2							NON		2	NO.
PART/3UB	HESPUNDUM 201 202 203 204 205 206 207	204 2	502	2 90%		208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 217 218 219 229 229	2 60	10 2	11 2	5 21	13 2	14.2	15 21	16 21	7 21	8 21	9 22	221	255	223	224	225	226	227	228	224 6	950
0 I A	YES YES YES	YŁ8		YES YES		YES YES	r. S	>	YES	፟	YES	Ξ	1 S 1	YES YES YES	S YE	2)	YES		Y 1: 5	YES YES		YES		YES	703	YES COZ YES YES	it s
9 10		5	C 0 2								ວັ	200									703						
¥ 10	100						Z	NON	z	NON						NON	z	N S S	_				NCN				

-13
PRUJECT?
Ħ
2
ASSIGNED
MENE
IL AMS
INDIVIDUAL
HOM MANY
HOH
4
QUE STIUN

108 109 110 111 112 113 114 115 116 117 118 119 120 121 123 124 125 126 127 128 129 150	. 003 003 003 003 002 MIS 004 003 EFU 004 003 004 004 004 007 045 001 MIS 001 001 006 004
123 1	007
122	200
171	700
120	1004
51.	S 004
7	00 7
= 0	00
11 51	33.00
7	04 00
1 \$ 1	15 0
1 211	M 700
=	003
110	100
601	603
0 0	003
107	4/2
901	000 N/A
105	1004
3 10	00 7
00K	\$ 00
HESPUNDOR B 101 102 103 104 105 106 107	1 001 005 003 004 004 004
ī -	ō -
PAR1/SUB	00 10

92

SACRAMENTO AIR LOGISTICS CENTER MCCLELLAN AFB CA SERV--ETC F/6 22/2 RESULTS OF A SURVEY SOFTWARE DEVELOPMENT PROJECT MANAGEMENT IN --ETC(U) DEC 79 R H THAYER, J H LEHMAN SM-ALC/MME-TR-79-54-VOLC NL AD-A117 998 UNCLASSIFIED 2 № 5

HERE ANY OF THE POSITIONS IN THE DEVELOPMENT URGANIZATION HETEWERS STRUCTURED PROCKAMING, 1976, AND BRUGNS MYTHICAL MAN-MONTH, 1975) A, CHIEF PROGRAMMER B, BACK-UP PROGRAMMER C, PROGRAM E, ADMINISTRATUR E, ADMINISTRATUR F, EDITOH C, CO-PILOT H, PRUCKAMING CLENK I, TUOL SMITH J, TESTER K, LANGUAGE ARCHITECT M, SOFTWARE ARCHITECT M, SOFTWARE ENGINEER (ADDED) N, TECHINAL DIMECTOR (ADDED) Y, NONE OF THE ABOVE (ADDED)	109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130			YES YES			YES	200	SIE	N NON
THE FG CHIEF CHIEF CHIEF BACK- BACK- BACK- CO-P- THOR THOR THOR THOR THOR THOR THOR THOR	107 108 109 11									NON NON NON NON NON
E E W C S G W L G E H P K L E K P K P K P K P K P K P K P K P K P K	RESPONDUM 101 102 103 104 105 106 107 108		YES	YES	YES					
	RESPONDUM 101 102 103 1	re s	-	,	YES Y	rés				NON
	NO4	>						C 0 2		

PART/SUB		201 202 203 204 205 206 207 208	2 203	204	502	206	207	807		210	211	212	213	214	, 515	2 915	17 2	18 2	19 22	77 O;	1 222	223	422	555	26 25	209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 221 228 229 250	229	250
V 10	Ţ	YES YES	ø	YES	res res		`											7	YES		YES				7.	YES		
9 10	YES	S 7 Ł S	grà.												_	Y E S									¥	YES		
01 C	YES	9 YES	en.																YES	S)	YES				¥	YES	71.5	
3 10																									YES	n	Yt S	
01 F																>	YES											
1 1			YES										YES YES	YES											YES	ဘ		
٦ : ٥				YES										-	YES	>	YES										YES	
01 L				YES							YES																YES	
N 10				YES		YES																						
¥ 10							NON NON		NON	NON		NON					3	NON		NON	_	NON	NON	NON	NON	Z O Z		NON

WHICH UP THE MANY FURMS UP PROJECT URGANIZATION DO YOU FEEL CONTRIBUTES THE MOST TO THE SUCCESS OF THE PROJECT? UUESTION 67

PART	PART/SUB	HE SE 101	KESPUNDUR 101 102 1	103	NESPUNDUR 101 102 103 104 105 106 107 108	105	106	101	108	109	0 - 1	=	112	113	7	421 421 151 151 151 151 151 150 151 150 151 151	9	17 1	==	161	20 15	11	21 7;	3 12	12.	126	151	128	129	1 50
5	100 10	1 5	150	650	MIS USE 05J 05G 05G MIS MIS	056	SI	SIN	SIM	USH	2 E	USH (190 HSO	190	2 ×	MIS 05B		051 UNK 05G	D XK		NSU NSU NSO	ž Už	N HIS	S H	HIS OIL	2 E	1053	S.	USF	D/K
6	01 002		05J 05K	05K						US.J	-	920	_	21.3		-	ეჯი			Š	05c						05M			
5	01 003																3	970		ë	050						06			
5	01 004																3	070												
0	500 10																3	070												
PART/SUB	/SUB	RE SF 201	RESPONDOR 201 202 20	203	KESPONDOR 201 202 203 204 205 206 207 208	205	206	207		508	210	211	212	213	214 .	209 210 211 212 213 214 215 216 217 218 219 220 221 222 224 225 246 247 228 224	16 2	17.2	7 91	19 2	\$0 5 5	11 22	2	\$ 22.	4 225	226	1227	228	229	230
5	100 10	051	2	05£	051 MIS 05E 05F 06E MIS 05G 05G	06E	S I	950		N I S	2 I	MIS	SIM	950	USY USY	USY G	05H H	MIS 05L	ر ا	05H M	MIS 056	9¢ 05B	950 A	S H 3	S M S	3 05F	05F 05E	050	150	A / A
•	200 10	390													_	06f							390	Ų				060	USJ	
5	01 003														_	06B													V 60	
6	01 004														_	061														

QUE ST I UN		4						IF Y PROJ RESO ORGA	CCI ECI UNCE NIZA	AD 1 MAS S AV 1 LUN	URGA URGA Alla	THIN NIZE BLE ICH	0, W 10, W 10 U ASPE	HAT NOTE CI N	MER ACTI	JU P	IF YOU HAD IT MITHIN YOUR POWER IO MAKE ONE CHANGE IN THE WAY INE PROJECI WAS URGANIZED, WHAI ACTION WOULD YOU TAKE, OH IF YOU HAD THE RESOURCES AVAILABLE TO UNDERTAKE RESEARCH IN ANY AKEA UF PRUJECT ORGANIZATION, WHICH ASPECT WOULD YOU EXPLUKE?	UNE YUU H IN LUKE	CHAN TAK ANY	6F 1 F, 0 ARE		Y CC Y CE	T TH	_ I							
PART/3UB	30	H 8	HE SPONDON 101 102 1	20K	MESPONDON 101 102 103 104 105 106 107	0	2.	9		01 8	=	= 0	=	7 11	= ~		2 11	11 9	-	=======================================	9 12	0 12	7	21	3 120	125	126	108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	128	129	130
01 001	100	Z I	51 H	3 01	MIS MIS OIF MIS PSC 056 MIS	s PS	50 1	E		S S	s 05	Ī	s 05	Z	Z S	S M J	MIS MIS USH MIS USH MIS MIS MIS CID PIC PIC MIS UIF MIS MIS MIS MIS MIS	s C1	١٠	C P1	E U	8 81	Ŧ	E S	E S	SIW 2	MIS	MIS MIS MIS	N S	USF	85A
0	200										190	ڀ	USM	Į																	1 6 X
01 003	\$ 00										076	و																			
0 10	400										07#	Ξ																			
500 10	500										076	<u>u</u>																			
PART/SUB	9	HE S 201	HESPONDOR 201 202 20	20R	KESPONDOR 201 202 203 204 205 206 207	502 ±	5 20	9 20		0Z 9	6	0 21	12 1	~ ~	13 21	<u> </u>	15 21	12 9	7 21	8 21	6 22	6 22	1 22	2 22	3 22	522 t	977	208 209 210 211 212 225 226 227 228 229 229 220 220 229 212 215 215 215 215 217 218 209 209	. 558	529	2.50
01 001	100	NON	NON DSB MIS	H		NON HIS MIS	Z S	S N/A		PRD MIS MIS	E E	S I	E S	0 8	\$£ 0.	F F	MIS MIS USE OCH PBE OSA NON OZD MIS MIS SII USG OCE MIS	N V	, N	E O	S M	s s	1 05	90 9	¥	W S	CK)	MIS ONA MIS UBI CHB 52E	190	CKB	5.2k
01 005	₹00															ž	K1A 03B	10									SHO	_	F90	Ë	
01 003	103							a								ž	20													CHD	

	30			Yt S	S	3.0				C 0 3		3	
	109 110 111 112 113 114 115 116 117 118 119 120 121 123 124 125 126 127 128 129 129 130	YES		÷	MPA MCP MCP PEN VPE OCU MGK MGK MPD MGK MPD NEN MGK MCP MPD VPG MCP M1S MEN MGK VPG PMS	224 230				ن		VPG HCP HCP FEN UNK MEN MPA MEN MEN HCP	нго
	28 1	×		Y ES	> >	228 2				YES		Z	3
	27 1.		97	7	Ĭ.	2 7 2	YES			F		¥	
	9:		YES YES	YES	ž S	\$ 9.	F			so.		Ī	
	80 22		¥		Ξ.	ري بر				S YES		×	
	4 12			s Yts) H 9	72 #				YES YES		z z	
>	3 12			YES YES	*	155 855 855 PSS 855			sa	YE		e fr	
# 	2 12		M	¥.	¥	2 22			s YES			ī	
KO J	1 12	an.	C 0 3		Ž	218 219 220 221 222			YES			J WC	-
<u>2</u>	21 0	YES	_		3	25.				_			
H)21 (003		Æ	55(_	YES		II.	
- 50 - 60 - 60	=		YES YES		H C	219			res yes			MCF	
40.JE	=		YES		E		YES	Y £ 3	YES			MCF	
H?	=======================================			YES	M P D	21.7			CO3 YES			E S	
THE SOUNCE OF THE PHOJECT MANAGEM? HIRE FROM ANOTHER COMPANY HIRE FROM ANOTHER COMPANY SFEN FROM ANOTHER PROJECT SFEN FROM MITHIN COMPANY OTHER THAN PHOJECT SFEN FROM MITHIN SRUJECT (ADDED) HUCLET MANAGER WAS APPOINTED OR SELECTED FOR THIS PHOJECT BY HUT HAVE A PHOJECT MANAGER (ADDED)	911			YES	# CH	213 214 215 216			C 0 3			MPD MGR HIS MGR PEN PEN MGR PMR HIS MCP MCP MIS	
LE OF THE PHOJECT MANAGANOTHER COMPANY SCHOOL ANOTHER PHUJECT WITHIN COMPANY OTKER F WITHIN SHUJECT (ADDED) NAGER WAS APPOINTED OR PHOJECT MANAGER (ADDE	115		YES YES		MGM	215					C 0 2	HER	
OJECT PANY ANY PPOI NAGE	114		YES		000	214			YES			PEN	
F PRO	115			5 3 3	VPE	213				Yt S		FER	
ANOTHER CUMPANY SCHOOL ANOTHER CUMPANY ANOTHER PRUJECT WITHIN SRUJECT NAGER WAS APPOI	711		YES		FFN	212			YE S			MGK	
SOUNCE OF THE PHOJECT FROM ANOTHER COMPANY FROM SCHOOL FROM MITHIN COMPANY OF FROM WITHIN SHUJECT CT MANAGER WAS APPOINT AVE A PROJECT MANAGER	Ξ		YES		MC.	211				YE S		H IS	
THE SOURCE FROM STEER	911			YES	MCP	209 210			YES COS			MGK	
THE SOUR BIRE FROM SPER	109			YŁ S	A 7	508			YES				
MAS THE NEW HINE THANSFER THANSFER THANSFER THE PRUCE THE PRUCE THE PRUCE THE PRUCE	10		YES		MGR	208				C 0 3		I	
₹	107		COS YES		0 TH	207			YŁ S			¥ ¥	
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	100			YES	A R	206			YES YES YES			MGK	
	105		YES		HEN	205			YES			MEN	
	104		YES		MC P	204	YE 3					VPC	
	RESPUNDUR 101 102 103 104 105 106 107 10			YES	9 A A	203			YES			MPD MPD VPG MEN MGK MEN PMW	
	NESPUNDOR 101 102 1			YES YES YES	VPG	0ND0 202			YES YES			1	
2	NE SF 101			YES	MPD VPG VPG MCP MEN MEN OTH MGI	HESPONDOR 201 202 203 204 205 206 207 208				YES		M GR	
80	SUB	•	J	۵	ia.	308	•	3 3	J	9	w		~
DUE ST 1 DN	PART/SUB	5	5	5	5	PART/SUB	5	5	5	5	5	5	10
ž	à					2							

	1 \$0	000	510		2 \$ 0	004	619	
	129	000	000		678	500	110	
	971	710	000		2 C B	500	500	
	131	900	500		122	700	910	
	971	010	510		328	500	906	
	\$7	, 521	٠ ۲		55,	000	250	
•	*	000 YES 007 005 025 010 006 012 006 060	005 YES 020 015 UZS 019 00\$ 000 008 015		, 425	500	7 7 7	
	571	700	070		552	000	900	
	771	11.5	st		275		000	
Ξ	3	000	105		. 177	500	114	
<u>z</u>	120	_		=======================================	7 0 7 7	/ / 00	000	
HAVE.	411	010	700		517	002 005 015 015 002 010 005 007 005 011 000 004 000 0us 0u2 0us 0us	00s 005 015 012 010 010 007 000 014 000 008 014 022 008 010 005 017 015	
¥	1 18	۲00	9		8 2	010	010	
MANAN DE D)	"	000	710		717	700	910	
+ T. F.	9	0.20	\$10		912	\$10	210	
FR03	÷:	100	900		215	د <u>۱</u> ۰	510	
HE S + + + + + + + + + + + + + + + + + +	7	010	000		21 4	500	900	
346.1 346.1 10.1	115	500	110		215	700	000	
NCF TRO TRO TRO TRO	112	9 0	910		212			S
Y YEARS EXPERIENCE DED THE PROJECT MANAGEM HAVE IN THE NG AMEAS? Lilonal area of Project ************************************	111	010	710		085 677 977 977 977 977 677 677 677 677 677	010	900	
SS? ARE SSIN	9	210	900		210	700	100	
E AMS AMF A UNAL HOCH EM EE	109	100	500		50 <i>2</i>	015	200	
3 × 4	2 6	200	710		90₹	004	970	
HIIM MANY YEAKS P. FULLIMING AKEAS? A. FUNCTIONAL AI U. DATA PHICESS Y. NO EXPERTENCE	107	700	0 2 0		207	002 002 002 020 004	019 005 004 020 026 002 001 006	
# Z 4 5 × 4	106	010	500		70₽	200	700	
	105	800	5 1 0		202	200	900	
	104	003	90		704	005	019	
	¥ 50-	000	010		¥ 20 \$			NON
	NESPUNDON 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 125 124 125 126 127 128 129 150	015 010 001 001 001 001 015 001 015 010 010	015 011 010 065 015 010 050 015 010 010 015 018 110 000 110 015 015 010 1005		MESFUNDUH 201 202 203 204 205 206 207 20	015 010	070 610	
70	HF SF 101	910	919		HE SF 201	910	070	
20t STIEN 70	SUB	⋖	£	~	SUB	<	2	3 =
10 80	PAR1/SUB	V 10	£	7 10	PART/SUB	V 10	5	5
7	3.				1			

	_			,,										
	35.												1.02	
	\$					0 0 3			900					
•	 10	~				∍			•					
	2	210 000												
	[2]	000	700	900	900			ረ በ ዐ	-					
	76												1 1 1	
	ځ ـ		Ý										_	
	7		ሪላን											
	124											2		
<u> </u>	123		007											
- 4 - 4	2												3	
	-												1.02 (02	
<u> 2</u>	12												â	
4 0 0 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	120					005								
2 4 £	2		010											
5	=		9										3	
3 P P P P P P P P P P P P P P P P P P P	=												602 CO2	
3	=												00	
4004	9 .											N		
TEMS OF FRIDK EXPIRITOR DID THE PROJECT MANAGER DATE OF CAPACITY A ENCIAL MISSINESS NITE TO STAND TO DE CAPACITY OF THE STAND TO STAND T	188 189 119 111 111 111 111 111 111 111				700			200	70			_		
ACT	3			ç	•	0		¢	004 010 010 000 010 000 7	٠				
S S S S S S S S S S S S S S S S S S S	.=		_	900	_	004 010		4.	5					
44	Ξ		200		900	700		700	00,					
A A A A A A A A A A A A A A A A A A A	3			900					910					
A TANK THE PART OF	=		\$	•		ž		\$ 00	88					\$ 00
MATERIAL STATES	-		ž	3		605 005		ž.	ě					š
THE OF THE TAY OF THE TAY OF THE	Ξ		602 008 00 5	700		00			9					
UMING ARTS OF PRIOR PRPERITESS AREA COMMERCIAL SIGNALIA SIGNALIA SIGNALIA SIGNALIA SIGNALIA COMMUNICA MAI INTUMMATION SYSIEMS COMMAND AND CONTROL MAI INTUMMATION SYSIEMS COMMAND AND CONTROL MAI INTUMMATION SYSIEMS COMMONICATIONS COMPUTER OFFICETIONS COMPUTER OFFICETIONS NO EXPERTENCE/NO PROJECT MA COTHER OUT = FUNCTIONAL AREA TO OUT = ANALYSIYPHOGRAMMER IN OUT = ANALYSIYPHOGRAMMER IN OUT = ANALYSIYPHOGRAMMER IN OUT = ANALYSIYPHOGRAMMER IN OUT = PROJECT MANAGER IN	30.		700	700	005			003	700					
A MANAGEMENT A MAN	ž	500												
CONTRACTOR	=	3										s		
HILL HANT TEAMS OF PHILLS THE EXPERITES. CAPACITY ANEA A. COMMERCIAL/HISINESS B. SCIENTIFIC. SIMULATION C. SIMULATION C. SIMULATION C. MAIL THE SYSTEMS) E. MET INDEMMATION SYSTEMS E. MET INDEMMATION SYSTEM COMMAND AND CONTHOL F. MET INDEMMATION COMPUTER SUPLIESTIBNS I. DATA COMMUNICATIONS J. COMPUTER OPPLICATIONS Y. NO EXPERTENCE/NO PROJECT MAIL COMPUTER OPPLICATIONS Y. NO EXPERTENCE/NO PROJECT MAIL COTHER OTHER OF THE TOWN OF THE	=	21	9	24	1 0							S E		
	NESPUNDUM 101 102 103 104 105 106 10/	700	010	200	800	910								
	105	001					00	000	001	00	00			
	3 0											S.		
				001	003	50			50			-		
	20K			ŏ	ě	014 019 005			100 010					
•	ž 2					0			5					
=	KE SPUNDUK 101-102-1		600	005		014))					
K	8													
sut S I I un	PAKI/SUB	V 10	- -) IO	9	10	1 10	ء د	=	=======================================	J 10	x 10	-	7 10
3	A A	•	•	•	9	•	=	3	2	3	•	•	3	•

	110000000000000000000000000000000000000																					
PART/3UB	MESPUNDUM B. 201 202 203 204 205 206 207 208 209 210 211 212 215 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 250	13 204	507	700	207	802	502	, 115 015	212 215	214 2	15 216	217	218	219 2	177 07	222 223 4	22 428	5 226	127	827	622	2 50
A 10			000							000			005				700	~	7 N N			400
9	070		200			_	100			100		010	005	100	605		900	20		00	500	
010	0 1 0					_	100			000		200	900							500		
0 0			005	002 004 050	070			/		000			002	500						900		
. 01 E	0 > 0		200		050			700		0 200	510	010	900 010							500	900	
01 F			700							000			00				900	s			700	900
9 10	615		200	002 005						0 500	500		500	500			010	•		900		
I .	070		200	002 004 010	010				700	500		800	900	500			004	7		005		
1 10	010	900		00						000			000							900		
٦ 10			900	100 900						100			700							900		
X 10	MIS UNK	¥																				
¥ 10					_	C 0 2		C02 C02	C 0 2		C 0 5			د	C 0 2	CO2 CO2 CO2	:02	100				

101

PART/SUB	HESPUNDUR 101 102 103 104 105 106 107	13 10	\$01 h	106	107		104	0	=	711	113	7	115 1	-	11 11	11 8	21 6	71 0	1 12,	: 123	124	108 109 110 111 112 115 116 115 116 117 118 119 120 121 125 125 126 126 127 128 129 150	156 1,	27 15	92	51 5	2
4 50			00	_																							
9 ¥ 0			00	00 \$ 00R	_		00									900	δ					010					
0 8 0	000	9		005	_		700					-	100	ŏ	200												
03 6	000 001 003	<u></u>		900	_									ŏ	200							•	500		3	500	
9 50			200	۵.														001	_								
9 50			900	_			008																				
0 S H	004 003	~	700	۵.										ŏ	700							•	200		ŏ	500	
03 1			700	۸.																		•	500				
03 J																						J	500				
× 40		N I N	ø		2 1								I	S I W							N S						
V 80						C 0 2		CO2 CO2		C02 C02	C 0 2	C 02			C 0 5	22	C 0 5	<u>~</u>	C 0 5	700 Z	. .		ŭ	CU2 CO1	<u> </u>	3	707
PART/3UB	HESPUNDUM 201 202 203 204 205 206 207	15 20	202 H	206	207		208 209 210	210	211	212	215 214		215 216	16 21	217 218 219	18 21	6.	22 0	520 527 528 628	553	524	225	225 226 221	21 23	58 85	052 622 822	3
0 § A											_	000										200					
0 3 15			100									000	9	008 00	004 003	5 00 3	~				500	900		ŏ	100 700	=	
0 § C											-	000		ŏ	500 100	š								3	700		
0 8 0			100	700 100	•						•	000			ă	100 800	~							3	700		
0 S t			000									000		ŏ	700 700	7			00	100 500				ŏ	002 01	500	
0 3 1										004		000			001	1						500			š	001	
9 \$ 0												000			ă.	005 003	~					010		3	700		
H & 0			100		900		003				_	000		ŏ	002 002 003)5 OC	~					004		ŏ	700		
1 50												000			001	-								ă	200		
٥٤ ر											_	000			100	-								ŏ	700		
x 50	MIS UNK	¥																									
0 5 Y	NON	C 0 2	2			203		C02 C03	700	_	₹00	COZ NUN COZ	700				ວິ	202 C02	~				C01 C05	٥٥		3	C 0 2

1 50

UUE STIUN	NO.	22				2 3	нісн	3.5	MHICH PROGNAMMING LANGUAGES AND AT MHAT LEVEL OF	NIN	. LA!	NGUA	it s	AND	. . .	TAH	1	=======================================		11011	N. Y	PRUFICIENCY COULD	a						
							FURITABN JOVIAL COHOL ASSEMBL CMS-2 (PL/1 (A HOL (UN NUNE/NO	FURTHAN JUVIAL GUNUL ASSEMBLER CMS+2 (ADU PL/1 (ADUE HUL (UNSPE NUNE/NU PK	FULLER HANDER FROUKANT FURTHAN JUVIAL COHULLER (UNSPECIFIED) (ADDED) PL/1 (ADDED) PL/1 (ADDED) HOL (UNSPECIFIED) (ADDED) NONE/NU PHOJECI MANALER (ADDED) UTHER	JNSPE 1000	MANUEL COLF.	NAUER PROCKAME (UNSPECIFIED) (ADDED) (I) (IFIED) (ADDED) (OJECT MANAGER (ADDED)	a a a a a a a a a a a a a a a a a a a	u t 0.)	•,	1911	£	•	OZ AVE KAGE	44		50 00 1			·				
PAHT/SUB	SUB	RESPUNDUR 101 102 103 104 105 106 1	104	01	5 100	0 1 0	01 10	9 10	1 6	0 11	=	1 71	13 1	1 7 1	15 1	1 91	17 1	2	6	50 15	71 17	71 77	51	1 2	421 821 721 921 521 821 521 721 121 021 611 811 211 911 511 811 E11 211 111 011 601 801	121	128	124	
01	~	005 001 005	002 001	1 002	A.		200		100 100		00100	002 00	0 700	0 5 00	0 100	0 100	100 100	100 10	~			9	200 200	N.	003	200 2			
10	20	700 700	۵.					200	~		ŏ	003	ā	800		ō	100												
10	ن		00	100 \$ 001	_		003	3 06	200 800	100 20		003 00	0 200	003						ŏ	700								
10	a	100 200 500		100	1 00 5	~	003	30 8	0.0 100	0.010.0	0 100	200	9	0 500	0 10	001 001 003	5 0			Š	200	0	003 003	00 \$	001 008 005	\$ 00 S		001	
10		100 800 800																											
10	•																							100	_				
6	×					S H	S																				S I M		
0	>-																		ت	200	203	¥							
PARTZSUB	SUB	HESPUNDOR 201 202 205 204 205 206	ħ07 1	- 20	> 200	5 207	7 208	602 8	19 21	210 21	211 21	212 21	213 2	214 215	2 51	216 2	217 2	218 21	2 612	220 221	7	\$25 528	\$ 224	4 225	5 226	125	228	224	_
10	<	\$ 0 0	003	003 001	1 00 1		005	2 00	001 003	13 001	=	ŏ	0 100	002 00	002 0	00 8 00	0 700	00100	0 100	002 001			0	100 100	1 00 1		001	000	
6	a	\$00					700	~								ŏ	00 \$ 00	008			001	=	200	2 00 5	~			003	
10	Ų			100	_		900	~		00	=		ò	003			ŏ	500						100	~	001			_
5	9	8 0 0		00	100 100	700 1	2 001	1 002	Ž	001	=	Š	0 100	0 10	0 10	001 001 001 005	0 20	0 10	0 10	10	001 001 001 001 001	=	0	00 -	100 100 100	700	700		
6	ı.																					200	~						
10	•	500							200	Ž			5	100						ă	200					001			
010	×	MIS N/A																											
6	>										3	C 0 2																	
10	7														ŏ	100										100			

GUESTION 75	13					IHE ALE		ī	a) FC	OF PROJECT MANAGER AT THE BEGINNING OF THE PROJECT MAS++++TRS	NAGE	¥	I H	n 19	2 2 2	5	=	7 7	J+ C1	S A E		THE							
PAR1/SUB	MESPUNDUR 101 102 103 104 105 106 107 108	NDDR 02 10	01 50	ā. 0	2 100	01 9	108	109	110	051 621 921 721 921 521 621 521 121 120 131 611 611 611 611 611 611 611 611 611	112	11.5	114	115	116	111	2	5 = 1	120	121	122	53		5	7 97	1 12	97	7	95
01 001 045 040 035 037 034 045 043 034	045 0	0 0 7	35 03	17 03	40 4	5 04:	\$ 034		1 035	034 035 038 041 042 035 045 041 039 040 050 MIS 055 045 049 049 045 040 055 MIS 039 059	041	042	0.55	045	041	039	040	050	<u>x</u>	0.55	650	045 (986	145	0 07	35 A	0 51	9.0	65
HLSPUNDUK PAHT/SUB 201 202 203 204 205 206 207 208	KŁSPUNDOK 201 202 20	NDOK 02 20	13 20	4 20	5 200	6 201	208		210	204 216 211 212 22 22 22 22 22 22 22 22 22 22 2	212	213	214	215	216	217	218	414	750	127	777	7 573	2.42	\$ 52	Z 97	2 12	2 82	₹ 5	95
01 001 045 045 UNK 047 024 026 042 043	045 0	45 08	40 AV	7 02	4 021	6 042	043		040	034 040 035 035 MIS 029 040 MIS 050 050 050 160 050 050 050 050 MIS 050 050 040 050	0.55	S I	670	040	MIS	0.57	030	0 \$ 1	0.54	0 56	250) 54 (0 151	0 77	2	\$4.0	0 27	2	0 7

UULSTIUN 74	MAS THE A. YES	PROJ MGK EVEK A CHIEF PROGRAMMER (AS DEFINED BY BARFR, 1972) ?	
	OJEC 1	MANAGE K (AUUED)	
	4. CUMMENI		
PAH 1 / SUH		RESPUNDUR 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 158 119 120 121 122 125 126 127 128 129	124 130
۷ ا ه		YES YES YES	
0 H	H YES YES YES YES YES YES	YES	YES YES
× •	NIS MIS	SIM SIM	
PANT/SUB	MESPONDUM 201 202 203 204 205 206 207 208	209 210 211 212 215 214 215 216 217 218 219 220 221 222 223 224 256 224 215 214 215 216 219 250	229 250
۷ : 0		TES YES TES	
9 10	YES YES YES YES YES YES YES YES	YES	YES YES
x 10	X CUNK		

OUE STION	£				PRICK 1 A - FUN 1 C - HUD C - HUD C - FRO C	3 J 4 4 4 5 4 4 5	HAN TO THE COLOR	TECH SAL PAN SAN SAN SAN SAN SAN SAN SAN SAN SAN SAN	PHOJECT MANAGEN KECETY (OH EAMLY IN) THE PRO TIUNAL AREA OF PROJECT MAL DATA PROCESSING KAN PROGRAMMING TECHNIU ECT MANAGEMENT KAMMING LANGUAGES (GTV /NO PROJECT MANAGEN (AT MAULECT MELATED AKEA	AGEN IN) OCE SOCE SOCE SOCE SOCE SOCE SOCE SOCE S	E C S S S S S S S S S S S S S S S S S S	THE PRO- THE PRO- THE PRO- PROJECT SSING TECHNIU TECHNIU TES (GIV	JECT JECT JECT JUFU	PINI DE VE	HUJECT MANAGEM RECEIVE THAINING IN ANY OF THE COME LANCE IN THE PROJECT OF VELOPHEM CYCLET TONAL AREA OF PROJECT OF VELOPHEM CYCLET THAIN AREA OF PROCESSING IN PROGESSING IECHNIUMS CT MANAGEMENT ARMANGE (GIVE LANGUAGE) AMMING LANGUAGES (GIVE LANGUAGE) PROJECT MANAGEM (ADDED)	Z X	C A C	177	¥.	PHOJECI MANAGEN KECEIVE THAINING IN ANY OF THE FULLUMING AKEAS I (OK EAKLY IN) THE PHOJECI I NAL DATA PHOGESSING I NAL DATA PHOGESSING IN PROGRAMMING TECHNIUM S ECT MANAGEMENT KAM MANAGEMENT I KAM MANAGEMENT I KAM MANAGEMENT I PHOJECT MANAGEM (ADDED) H PHOJECT HELATED AKEA	ž	¥ *	on.							
PART/SUB	HESPONDUK 101 102 103 104 105 106 107 108	13 104	501 -	01	01 9	7 10	9	1 60	101	=	15	113	114	115	116	1117	=	61.	15(061 451 451 751 951 551 451 551 751 151 051 611 411 711 911 511 811 511 711 711 911	122	123	124	125	126	121	128	129	3	_
V 10	YES	71.5	YES YES YES	YE	'n			Ξ	YES Y	YES Y	Yts		YES		YES							YES	YES	YES	YES	YES			7 t S	
9 70	YES	YE S	YES					=	res y	YES Y	Yt S				YES		YES			Yt 5		YES		YES YES	Yt s					
3 10						Y.	ø		>	YES Y	YES						YES		YES	Y 1 5			Yt S		¥ 8					
o 10	YES	16.5		YES	.n			Ξ	YES Y	YES Y	YES	YES	Yt S		YES	Yt S			Yt S	. YE S			Yt S		Yt S					
0 1 E	YES	YES		YES	'n		YE	YES		_	Yts	YES YES	YES			Yt S		YES	YES YES				YES							
01 11	05	JOY FUR							>	YE S	_	3				7. C.R.	FOR FOR							7	YES					
×							•																				N N			
V 10	C02				C 0 2	~								C 0 2							N C N							203		±υ
7 10		2	_												H							UTH)/
PART/SUB	HESPUNDUH 201 202 201 204 205 206 207 208	13 204	205	20	20	7 20		7 6	209 210 211	11 2	212	213	714	215	9 7	217	414	219	220	415 217 217 218 218 218 217 217 217 217	177	577	224	445	927	122	977	677 978 578	250	_
V 10			YES	YES	en.	YES	SYE	YES YE	res Y	YES			YES	YES			YES									rt 5	¥1.5			
9 TO				YŁ S	~		YES	s,				YES	YES	YE S		YES									\$ 11	YES		71.5		
01 C				YES	7 0		YES	s	>	Yt s									YES	_			YES		Yt s	YES				
0 10	YES YES	on.				YE	'n	¥	YES Y	YES Y	YES			Yt s		YES	YES			7 t. S	YES YES			YE S		YES	YES	71.5		
01 £	YES					¥	SYE	S Y	S YES YES YES	S)				re s		YES			YES				YE S	rt s	X 1 S		14.5	11.5		
01 F1	¥0.4			FOR	~				I	HAL	•	T CK	FOR									20						11.8		
24 10				A S.									ASS																	
× 10	N N																													
۸ 10		C 0 5			700	٠.									C 0 2			C 0 2											C 0 2	

LESS THAN HIGH SCHOOL LESS THAN HIGH SCHOOL MIGH MIGH SCHOOL MIGH MIGH SCHOOL MIGH MIGH MANGER (ADDED) OID NUT HAVE PROJECT MANAGER (ADDED)	081 421 421 721 921 521 521 521 521 120 150 150 151 511 511 511 511 511 511 110 111 011		YES YES	YES YES YES CO3	YES YES YES	VES YES YES YES	209 210 211 212 213 214 215 217 218 219 220 221 222 223 224 225 217 218 217 228 229 230	\$ 14	TES YES YES YES YES YES YES YES YES YES Y	YES YES YES YES	11.5	
HIGHEST FUNCATION LEVEL A. LESS FRAN HIGH SCHOU B. HIGH SCHOUL C. AA DEGREE OR PRO YE D. BEINER & AND 4 YEA E. BS/HA DEGREE F. MASTER DEGREE G. MASTER DEGREE H. PHD (ON FUNIVALENT) Y. DID NOT HAVE PROJECT Z. OTHER	HESPUNDOK 101 102 103 104 105 106 107 108 109 110	YES YES	YES	s YES YES			MESPONDUM 201 202 203 204 205 206 207 208 209 210	YES	YES	YES YES YES		
•	KESPUNDOK 101 102 103 104		YES YES	YES YES YES			HESPONDUR Pari/Sub 201 202 203 204		VES YES	YŁS		SIE
2 C C C C C C C C C C C C C C C C C C C	PAHT/SUB											

I MANAG
PRUJEC
Ĭ
=
11
JUE ST 10N
3

7.7	=	IF THE PRUJECT MANAGER ATTENDED COLLEGE, MIS MAJOR OR SPECIALITY WAS?
	٨.	COMPUTER SCIENCE
	œ	MAIHEMAIICS
	ر.	ENCINERING
	å	PHYSICS (ADDED)
	•	GENEMAL SCIENCE (ADDED)
	•	BUSINE SS
	;	LIBEHAL ANTS
	۲.	DIO NUT ATILND/NU PRUJECT MANAGER (ADDED)
	;	טוחגא

128 129 150			YES YES			нон) 9		YES YES	707		YES		
109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130		78.5	Yt S	C 0 2			204 210 211 212 215 215 215 215 219 219 219 219 219 215 215 215 215 216 219		YES YES	Y S				YES	
20 121 125 123	YES	46 S	YES YES YES	C02			525 555 155 05		TES TES	£S C.03					
117 118 119 1		YES	S YES YES YES	Ü			5 217 218 219 2			S YES YES YES YES					
113 114 115 116			TES TES TES TES TES				213 214 215 216	YES	YES YES	rts yes	C02				
109 110 111 112		YES	TES YES YES				212 112 012 60		76.8	YES YES YES					
		S YES YES	YES		'n				Yt S	YES YES YES YES Y		C 0 2	YES		
MESPUNDUK 101 102 103 104 105 106 107 108		YES	YES YES	~	YES YES		MESPUNDOR 201 202 203 209 205 206 207 208							YES	SIE
PANI/SUB 10	A 10	H 10	01 C	01 D C05	01 6	٠ ١٥	ME: PAHT/SUB 20	A 10	H 10	01 C YES	0 1 0	01 t	9 10	9 10	× 10

	73	100		100		000	100						
	•						•						
	2	9		9		90							
	125	001		100		001			001				
	124	100		060	040	200 100 060	010	070					
4 2 2	23	001 001 001 001		100 100 060 010	070	6.55	700	90	100				
7	2	-	~	•	9	0 25 0	0 100	800 900	0 7				20
	2	00 -	200	^		9		9	700 1				018
H THE LIFE INDIVIOUALS USISTING WA USISTIN	7	100		000	005	670	100	100	00				
7 7 7 7 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	120	001	005	650		070	001	012	00				015
A A A A A A A A A A A A A A A A A A A	611	001		003		005			001 003 001				
HOPE S IN	9											70 0	
V CATEGORY UAL NUMBER UJECT NUMBER PROJECT TIL 01 AUTHURIZED	12	100				070		003				0	
	106 107 108 109 110 111 111 111 111 115 116 117 118 119 120 121 122 123 124 125 126 127	0				ð		٥			S		
DOE TE	= -	_									M S		
1 1 1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	=	00				900							
A CALLER A C	=	100		003	700	500							
ADDO GEING	11.5	001											
PUSITIONS SI NEXT IONS SI NEXT (E.C. INION THE CAL INDIVIDUALS IND	7	100			005	900							
ND INC. NO. I I I I I I I I I I I I I I I I I I I	=	10			Ī	Ū	001	100					
H OF FUS P CLISTON P CLISTON HEE INDI D D MANAGE ANAER AN ANAER AN AN ANAER AN AN AN ANAER AN AN AN AN AN AN AN AN AN AN AN AN AN A	0	0 10				2	0 100	•					
NUMBER TE SED THE S		1 00		٠		1 012	ě						
CCUSTON CANAL CANA	10	00		900		110 1		_					
THE NUMBER OF PUBITIONS AUTHURIZED B PRUJECT AND LIST NEXT TO THAT THE ACT CNATED. THESE POBITIONS (E.C., IF ONE PREDED THE EDITED BY THREE INDIVIDUALS AT DIFFERENCES BY THREE INDIVIDUALS AT DIFFERENCES PRUJECT MANAGER (ADDED) FUNCTIONAL ANALYST (ENGINER) (ADDED) DATA PRUCESSING ANALYST SECRETARY ASSECRETARY OF THE ASSECRETARY A	701	001 001 001 001 001 001 001 001			900	013		001					
1	107	001		001	001	900				005			
J=000# <## >>	90	100 100		005 005		003		100					
	65	10		705		008 003	700	100 100					
	104	YES (YES (YES	YES (yes (YŁS (Yt S				
		>		~	>	-	>	>	002 Y	20			
	RESPONDUM 101 102 103	-				۰		_	0	900			Q,
	HESPONDUH 101 102 1	100		010 503	_	020 520	_	100 100		_			005
8 .	ME S	100		500	900	0.25	003	001	001	003			
5	Ë		_		_				_			_	
20 21 21 21 21	PANT/SUB	V 10	9 10) IO	0 10	01 E	0 1 F	9 10		0 1	01 ×	Y	7 10
3	ď	-	-	-	-	-	-	-	-	-	-	-	~

001

128 129 130

110

E S

205 206	MESFUNDOM 201 202 203 204 205 206 207 208 001 001 001 001 001 001	407		205 207 208	100 Z00	210	117	212 213	3 214	1 00 1	215 216 217 218 219 001 001	217	218	213	977	100	2 2 2 2 101	, , , , , , , , , , , , , , , , , , ,	250 221 222 253 224 255 250 100 100 100 100 100	458	122 1	100	427	200
			;	;				;	;		•		•	}	•								•	•
001 000 001	003 001 000 001	001 000	001 000 001	100 901		700	050	003	3 004	110 7	010 000 010		500	100 510 500	\$ 00	_	900 900		900	3	100	007		990
040	070	040	040	97		700	090			010	1000	100				100		ŏ	900		004	210	990	9
006 015 012 012 034	036 006 015 012 012 034 003	015 012 012 034	012 012 034	12 034	_	900	001	010	0		005	900	010	510	900) 700	155 0	0 00	010 012 000 005 032 000 012 015 050 010	070	010	500	070	a
100 100 100	*00 100	700 100	001 000	100 10	_		700						100	-	100	•	200				00		800	
100 100 100	001	001	001	001		100	700				001	200 100		001	100	•	00 5 00	100			001	100	700	
100 100	100 100 100	100	100			100				100	1 001		100	100									700	
200	700					004										•	500				00		790	_
																9	5 0 0							
0 510	21	21	21	12	•	050																808	010	

1 50	200	100	500	900	000	0 0 0	000	200			2 50	200		070	050	0 4 0		500	500				
									<u>≈</u>		455	700		900	800	770	908	200	700	900			010
110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129	700								_		0\$2 622 922 L22 922 \$27 822 £27 222 £22 622 612 912	100		015 004 008 008	210 500	010 003		100					010 900
121		700	500		700						227	100		004	400	010	100	100		400			
126	100	100		700							977			015		0 2 0							
125	100	000		001 005			200				552	001				210							
124	900	017	120	075	030	000					224	000		010	210	0 2 0							
125	700	010	070	\$70	700	210	003				223	200		010	_	010		700					
77	200	_		150	700	900	700			070	222	200 200		012		245	200	400		900		500	
171	200 500	910	010	050	700	700	200				221	100			500	004 042 010 020 015 030				_			
120				090	700	070	700			015	027	001		003		900	001	001					
2	200 100	001 500		700			100				612	100		020		110	-	500	001				
118	rts (Yts (•							812	003 (001 020 003		015 017 000	200	005 008					
-	700			0 # 0		900						005		900	500	900		700		•			
91	Ū			_		Ī			S E		918	005		600	\$00 500	900		700	001				
411	100			900					_		215 216 217	001		012 009 000	110		003	200 100	700				
7 1	200	004	200	007								100		700					_				
113	700		_								213 214	001		500		010							
711	005		200	800							212	•				200							
=	700				100	200					112	700		090	67.0	150 002	004	500					
011	100			020 020	100						210	100		005 000	200	800	100	100	100	004			050
691	200	900		110							209	100		100		045	100	100					
108	100		900	910		100					208	100		900	040	710	100	00	001				710
	100	100	100	900				005			207 208	200		100		210		005					
100	700			700		700					206	100		200		070							
105	0.91	700		900	70,	200 100					502	100		500		900		005	100	005			
104	700	500	003	900 909	00	100	100				204	100				036		002 008	001				
103	500						003	§ 10			03	003		700	003					900			
HESPUNDOR 101 102 103 104 105 106 107	200	015		0 8 0		000				100	HESPONDUM 201 202 203										SIE		
HE SP.	000	900	000	035	003	001	100	700			KESP 201	200	00	004	300	510	003	700					
PARI/SUB	02 A	92 C	0 70	02 E	02 F	9 70	02 H	1 20	× ~0	2 20	PAKT/SUH	02 A	02 B	02 C	0 2 0	02 E	02 F	9 70	¥ 70	1 70	× ~0	0 Z	7 70
1	9		-	3	9	•		•	•	•	4	3	J	_	•	J	-	•	•	•	.	_	<u> </u>

	9			3					0 \$				001	
	RESPONDON 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	040	500	001 500					209 219 215 213 214 215 216 217 218 219 22 125 127 228 228 228 218 217 218 218 218 218	9	9	050	=	
•	9 14	Š	3	3				ys .	8 24	031 050	000 050	9	9	
	21 1				•			N S	25 1	0 \$	00	Δ	٠ د	
	7				100				25		_	075	9	
	1 24							χ.	2 2 4 4	3	200 SOO	0 8 0	3	
	\$21				100				225	025	005		010 070 010 025 060	
	124	030		040 040					224	070		010	010	
	123			040	010				423	015 015 020 025 005	500	070 U70 055 100 100 090 100 100 065 055 080 100 U70 08U U70		
÷	122	010	040						222	015	200 500	010	010	
× × × × × × × × ×	171	040 010	060 510	0 7 0	919				177			001		
57 + + + + + + + + + + + + + + + + + + +	02							S E	82	010	010	0 9		
**************************************	2			00				2	19 2	15 0	0 05	55 0		
±	18 1			080 050 100	050				18 2	010 510 570	010 010	55 C		
K A M	1 2	•		01	9				2 7	9	•	0 0		
MAS THE SQURCE (BY PENCENI) OF THE PROGRAMMENZANALYST STAFF? NEW HINE FROM ANOTHER COMPANY THANSFER FROM ANOTHER PROJECT THANSFER FROM UTHER THAN ANOTHER PROJECT THANSFER FROM ANOTHE	-	010		ŏ				Ø				0		
PKE	11 5	•		•				RES	12.5		'n	0 1 0	'n	
13 <u>18</u>	Ξ.	070		050 030 000 050 050 080	•				4 21		005	60 0	002	
PAN)	=			150	050 050				21,			10		
E COTE	=======================================	070	010	070	0.20				213			100		
SOURCE CHY PERCENT) UP FROM ANOTHER COMPANY FROM SCHOOL FROM ANOTHER PROJECT FROM UTHER THAN ANOTHE (ADDED) CTON (ADDED)	711		040	090					212	010 010 035		055		
CE CHY ANOTHE SCHUUL ANOTHE UTHER JED)	Ξ	040		030			030		211	010	070	010		
SOURC FROM FROM FROM CADU	011			070	080				210	010	010 050	010		
MAS THE SOURCE (BY P NEW MINE FROM ANDIHER NEW MINE FROM SCHOOL INANSEEM FROM ANDIHER THANSEEM FROM UINER I ADD STAFF (ADDED) SUHCOMINACION (ADDED) OTHER	601					100			509	900	070	910		
ME ALKE NEE ALKE ALKE ALKE ALKE ALKE ALKE ALKE ALKE ALKE SCHCONIKE	801			570	675				808	040		0	0 3 0	
MAN	0.1			100 025					RESPUNDUR 201 202 203 204 205 206 207 208			025 030 100 03		
# < # ? ? ? ?	9	040	020	-	0 7				7 90			30	7.0	
	1 50	0 0 0 0	•	0 1	050 040				2 50	15	26	25 0	010 010	
	-	9		0	ð				Ž 7:	098 UIS	20	9	0	
	× ×	٥		010 050 050 010	•				3 2	ò	100 002 050			
	DUK 2 10	080 010 080	•	0.05	010				008 2 20		2			s
	KE SPUNDUK 101 102 1	0 07	010 010	20 0					RESPUNDOR 201 202 2					M I S
2	- K	9	ē	0					RE:			100		
2	SUB	<	2	J	3	w	•	×	SUB	<	2	J	2	×
AU 1 1 U N	PANT/SUB	6	5	5	6	•	5	5	PAK [/SUB	0	0	5	5	5
7	1								3.					

AI WHAI LEVEL WAS THE PRUGRAMMER SUPPURT LIURARIAN? A. CLEHK/PROGRAMMER IFCHNICIAN H. JUNION PRUGRAMMER C. SENION PRUGRAMMER Y. DID NOT USE PRUGRAMMING SUPPURT LIBRARIAN Z. UTHER	NESPUNDON 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	YES YES	YES YES		SIE SIE SIE SIE	NUN NUN NON NUN COI NUN NUN NUN NUN NUN NUN NUN NUN	н10	207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 225 224 225 226 227 228 229 250	YES YES YES	VES YES YES YES YES	KES YES	SIZ	
4 4 2 3 5 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	101 90					NON NO		207	YŁS				;
O 10	NESPUNDON 101 102 103 104 105 1	TES TES		YES		NON NON		HESPUNDUR 201 202 201 204 205 206 207 208	TES TI			SII	
20E 21 1 0 N	HARI/SUB	01 A	01 8	01 C	x 10	A 10	7 10	PARTISUB	0 T	9 10	3 10	x 10	

PART/SUB	V 10	9 I O	x 10	V 10	PANT/SUB	V 10	9 TO	J 10	× 10	01 Y
3 KE 3				NO.		rt s				
RESPUNDOK 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 125 124 125 126 127 128 129 150	YES	YES			HESPUNDUR 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 227 228 229 250		•		H IS	
0k 103				NON	UR 203					C 0 3
104				NON NON	204	YE S				
105	YES				205		YES YES	YES		
901	YES YES				206	YES	YES			
101				N S	207					NON
108	YES YES				208		YES			
70					209	YES				_
110	YES YES				210	-				NON
==	YES				, 115	YES				
112	YES			-	212	YES				2
113				ZOZ	213 2					z z z
1 41	YES			J	2 71:	-				NON
151			Σ	103	15.2	ES Y				
101			∑	ž	16 21	YES YES YES YES YES YES				
17 11	ĭ	λį		NON	17 21	SYE	Yt S			
1 1 8 1 1	YES YES	YES			12 8	S YE	S			
71 6	ဘ			C01	9 22	s YE				
21 0	Yt S			_	0 22	တ				NO.
1 15,	'n			00	1 225	YES				>
5 1 5 5				COI NON	223	YES YES				
124	YES	YE 5		_	455					S
125		X = X			225	YES				
126			Z S		478	YES				
121				N O N	227	YES				
128			N S		877	YES YES YES YES YES	rt s			
671				NON	577	Yt S	Yt s			
2.				Z S Z	2 50	Yt S				

THE CHIFF PROGRAMMENS MERF?

A. SENIOR PROGRAMMENS

B. FUNCTIONAL AREA EXPERTS

C. SPECIALLY FRAINED FOR TASK

Y. DID NOT USE CHIEF PROGRAMMENS

Z. DINER

UULSTIUN BI

auk ST I UN	ž		A B C C C C C C C C C C C C C C C C C C	MAS THE LESS THA HIGH SCH AA DEGRE BETHEN HISTERS MASSIERS THO COK	Sänwaaan	EDUCATION IN HICH SCHUCKUL E UN IND YEAR GREE GREE DEGREE DEGREE PUSSEREINS	EDUCATION LEVEL OF THE PROGRAMMEN/ANALYST (BY PERCENT)? HIGH SCHOOL ON TWO YEARS OF CULLEGE AND 4 YEARS OF CULLEGE FREE FREE FREE FREE FREE FREE FREE F	EVEL OF THE PROGRAMMEN/ANALYST L KS OF COLLEGE S OF COLLEGE SO HOUMS ON DUCTORATE CANDIDATE	CULLEGE COLLEGE COLLEGE	жобк 0С 1 ОН	MME K	/ANAL	DATE	7 7	**************************************	M M M M M M M M M M M M M M M M M M M						
PART/SUB	NESPUNDOM 101 102 103 104 105 106 107 108	104 105	101 901		104 110	==	1171	113 114	4 115	115 116 117	1117	1 18 1	118 119 120 121 122 123 124 125	0 121	122	125	1 421	55 120	126 127 128	2	129	1 \$0
A 10	000																					
9	000 500																			_	004	770
0	010 500	100 010										-	100) 500	770
0	010 010	010			010	_	0 0 70	500						010		600						
01 6	075 065	010	060 040 07	•	090 090	060	080	010 100	0 0 0	990	030			075		990	1 090	060 100 100 050	0 050	_	065 (035
9 10	010 500	010	010 040 060	659	040 010	010	•	050	050	980	010	050		010		070	035		979		900	
9 10														005		500						
5	\$00						3	900				050				500	900		025		100	
x 10													W I S	တ	S W					n E		
7 10	H10																				•	770
PAH1/SUB	RESPUNDON 201 202 203	204	205 206 207	208	209 210	211	212 2	213 214	4 215	216	117	218 2	219 220	0 221	275	223	224 2	525 528	6 227	228	2 622	2 50
V 10																					3	0 3 0
9 10		8 0 0																	050	010	J	510
01 C		003 015 (500				•	050 050	•											010	•	070
0 10	700	003 025				010			010		030			070				400		070	9	919
9 10	990	0 19 050 (060 001 060 050		080 080	070	0 880	080 080	0 0 0	070	090	0 0 7 0	025 070	0 0 0	0/0	040 040		010 080	0.025	000	040	500
0 1 F	915	500 010 900	500	010	915	010			050	0 7 0	010	0 040	028 050	•	0 \$ 0	070	0 050	070 012	5 025		0.00	570
9 10		800		•	800	010				010			010	•				005	•			
: :		800		J	200						•	0 0 7 0	017				010	500	۰			
x 10	MIS N/A																					
7 10					050																	

8 JUE STIUN

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	707	COS COS COS COS COS	707	707	SIM SIM SIM	1 CO1 CO1 CO1 CO1 CO1 CO1 CO1 CO1 CO1	KESPUNDUR 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228	C02 C02	CO2 CO3 CO5 CO5 CO5	707			CO1	
104 105 106 107 108 109 110 111 112 113		C02 C02				CO1 CO1 CO1 CO1 CO1 CO1 CO1	204 205 206 207 208 209 210 211 212 213	50 J	€05		C 0 2 ;			7 9 5
PART/SUH 101 102 103	01 A	01 B C02 C02	J 10	0 10	01 x	100 X 10	MESPUNDUR PAMI/SUB 201 202 203 2	A 10) 200 B 10	01 C	0 10	SIN X 10	01 Y C01	/ 10

DID THESE FURMER UPERATURS MAKE SULCESSFUL PRUCHAMMERS? (UNIGINALLY MARKATIVE) A. YES, EXCELLENT B. YES, GUUD/AVERAGE C. YES, FAIR D. NU, PUDH Y. DID NUT USE EX-UPERATURS AS PRUGHAMMERS Z. LUMMENT

UULSTION BE

1 50	000	900	000	000	000	000	000		2 50	gno	000	000	000	មេខម	\$ 2	E E E		
421	E E	2	Z Z	E.	Z Z	E E	2		455	900	000	2 2	e E	000	I I	I		
128	000	000	000	nnn	000	000	I I		228	000	000	000	2	000	000	E E		
	000	000	000	000	000	ľ	ž Ž		227	000	000	000	\$ \$	0110	2	Z Z		
126 127	E E	000	2 2 4	2	000				226	Z Z	999	ľ	000	2 2 2	81818	000		
125	nnn	000	600	ī	E E	E E	000 MMM		572	000	000	000	000	E E	2 2	000		
124 125	000	000	I I	2	000	000	E E		224	000 000 000 000 000	000 000	000	900	000	000	000 000 000		
	000	нив	2 2 2	Z Z	BUB		Z Z		22.5	000	2 2	ž Z	000	000		2 2 2		
122 123	000 000	I I	Z Z	z z	000	2			777	900	Z Z	E E	000	000	000 000	e E		
171	იეი	000	000	000	вни	нив	I I		221	000		nnn	i i	ĭ	Z E	I		
120 121	იიი	E E	E E	Z Z	ĭ	888			220	E E	000 000	I I	Z Z	E E	000	000		
119	Z Z	S S	z z	2	I I	2 2	z z	3 3	519	იიი	000	2 2	I I	Z Z		2 2		
2	Z Z	z z	2 2	Z Z	2 2 2	E E	ž Z		218	E E	Z Z	E E	I I	2	Z Z	e E		
		200	000	000	000	იიი	I I		712	000	000	E E	ž ž	000	000	E E		
116 117	000 000 000	000	000	000	000	ពមព	000	000	21°	000	NWW 000	2 2	E E	Z Z	E E	r Z		
115	000	000	3 2 2	000	000	000	I I		215	000 000	2	Z Z	2	2		E E		
114	000	000	000		000	ດດດ	000 MMM		714	900	E E	E E	2	I I	I I	I		
115	000	000	2	I I	000	I I	I I		213	000	000	000	000	900	Z Z	000		
112	3	2	Z Z	000	Z Z		E E		212	z z	000	000	E E	000	I	T T		
Ξ	000	000	000	I I	000	E E	r s		211	e E	000	i i	000	I I	r r	e E		
110 111	000	000	000	Z	იიი	I I	¥.		210	000	000	000	000	000	000	E E		
104	000	000	000	2	2 2 2	3 2 3	000		209	Z Z	000	000	ດດດ	3 3 5	r r	2 2		
108	I	000	I I	000	ľ	ľ	000		802	000	000	ž Z	I	000	I I	ł		
101	I	000	e	000 000 mmm	MWM 000	NMM 000	000			000 000 000 000 000	000 000 000 000 000 non	E E	UHP HEN	MWW 000	ANG SHE NEW	000 WWW WWW 000 WWW WY		
106	000	000	000			I	E E		206	000	000	E E	I	000		000		
105	000	000	000	I	e E	ł	I		204 205 206 207	000	000	Z Z	z z	2	Z Z	I		
401	3	ľ	E	g g	E E	I	I I		204	000	000	I I I	000	I I	ł	ž Ž		E E
103	000	000	0:0	000	ł	Z Z	I)R 203	000	000	000	000	000	000	000		
HESPUNDUK 101 102 103 104 105 106 107 108	000 MMM 000 MMM 000 MMM MMM	000 000 000 000 MMM 000 000 000	HMM DEG HMM DEG DEG HMM HMM	000 000 mm	ł	2	DOO DOO WAN MAN MAN MAN COO COO		HESPONDUR 201 202 203								H S	
HE SI 101	000	000	ини	2	I	Z Z	3		HES!	000	000	Ĭ		2	1	1		
SUB	<	2	J	0		_	ون	7	SUB	<	23	C	2		.	و	×	~
PAR [/3UB	5	•	10	6	0	0	10	6	PAK [/ SUB	6	0	0	6	-	•	5	01	•

MERT INE FOLLOWING STRVICES PROVIDED FROM WITHIN THE PROJECT MOMENT RESOURCES, ON SUPPLIED BY A STAFF FUNCTION WITHIN THE COMPANY?

(INDICATE HY INSERTING W FOR WITHIN THE PROJECT RESOURCES, OF FOR DOISIDE THE PROJECT RESOURCES, OF FOR BOILD)

A PERSONNEL

B. PERSONNEL

C. BUDGETING

D. COMPUTER UPERATION

E. TRAVEL ARHANGEMENT

F. TRAINING

G. TYPING

Y. NONE (ADDED)

Z. OTHER

OUESTION 85

		9	s		5	'n			
		4	Y1 5	'n	25	YES YES			
		.21	,_	Yt s	- 22.	, X			
		82 T	YES YES YES		42 B	YES YES			
		121	YES		177	Y & S			
		921	Yt S		526		YES YES!		
		125		¥ 5	525		X 1 S		
		h 7 1	Yt S		424	rt s			
	3	123	Yt S		225	YES.			
	MAS NŲ THAINING NEUVINEMENTS OK NO PROJECT MANAGEM (AUDED)	189 119 111 115 119 119 119 119 119 121 121 122 123 124 125 129 129 129 129 129	TES YES YES		204 215 215 215 255 255 255 255 255 256 257 258 218 218 218 218 218 218 218 218 218 21	YES YES YES YES			
چ	¥.	151		rt s	127	S t			
2 2 2	INALI	50		res res	07	f. S			
2	ž -	2	8	_	2		Yt S		
YINL	0.715.0	1 91	Cus YES		2 2	Ł S	-		
1 N	÷ .	1 /1	J	YES	17 2	res res			
WAS THE PRUJECT MANAGER RESPONSIBLE FOR IDENTIFYING TRAINING REQUIREMENT OF THE DEVELOPMENT TEAM MEMBERS? A. TES.	ž Š	1 91	20	>	2 91	YES Y			
X X	S I	1 5 1	YES YES		7 51	¥			203
IST F	1 ME 1	7	Ξ	တု	7	S			3
SNS N I N	102	11 5	တ	Yt s	5 21	TES YES YES YES			
RE SP UPME	ر ×	7 11	SYE		2 21	S YE			
GE K EVEL	z z	-	SYE		1 21	S YE			
HANA HE U	X X	= =	<u>بر</u> ح		17	¥			24
2 4	Š	=	YES YES YES YES YES		2				203
N I	Z Z	01	YES		502	YES			
THE F THE P TES	THE KE UTHE W	90	Yt S		802	¥ £ 3			
MAS THE HEUUINE! A. TES H. AC		101		7 t S	207	YES			
i x < r	~ ~	901	YES		206	Yt S			
		165	YES		205	YES YES YES YES			
		701	Tt S		704	YE S			
		. K	YE S.		203		100		
		UNDO 102	Y E.S		DNDO 202			M IS	
10		NESPONDON 101 102 103 104 165 106 107 108	TES TES TES TES TES		HESPONDUH 201 202 203 204 205 206 207 208	YES		_	
UUR STIUN BE		a s	_	20	3. 2.	_	£	×	-
JE ST		PART/SUB	V 10	5	PAH [/SUB	V 10	5	5	5
ร		ā			ī				

٠	1	4
	1	

ant s tun	2					_	1 KAINING		1003	KE UU I KE MEN I S		1. 1.	(A TE.	GENERATED AS	⋖	KE SUL I	3	Ξ	PRUJECI WERE	1	1 K								
						2 4 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7			SES COND SES		MHICH OF SOUT EMPL SOUT EMPL SOUT THE SOUT SOUT SOUT SOUT SOUT SOUT SOUT SOUT		HE FULL YED AND MOST IMP PRUJECT COMPANY THE SYST INDEPENT INDEPENT CULLEGES	ULLUWING AND KANA IMPUHIAN IRCI TEAM SYSTEM US PENDENI PRESSONI EGESSUNIV	HE FULLUMING SOURCES? (INSENT OF THE REMAINING MUST IMPURTANT) PROJECT TEAM MEMBERS LUMPANY LAUNE THE SYSTEM USEN INDEPENDENT TRAINING CONSULTAMIS HANDMARK/SOUTWARK VENDONS LULEGES/UNIVERSITIES	SUURLEST ORDER THI (1) MF MBF MS SER INAINING IMARE VEN FERSITIES	H I H I H I H I H I H I H I H I H I H I	Z 1 3	CINSENT O FOR REMEMBERIAL METAL META		ME THOUSY	* / s							
HAWI/SUB		RESPUNDUR 101 102 103 104 105 106	UK 103	701	105	100	101	168	109	0	=	711	113	4 -	115 1	116 1	117 1	18	611	1 021	121 125	2 123	3 124	125	126	121	128	129	1 50
4 10	001	1001		001 003	100	100	100 100	100	400	100	001	100		7	0 100	0 100	100	5	0 100	0 100	100 100	1 002	100 7	1001	000	100	100	100	200
9 10	005	2 002	000	000	005		000	200	200	000	008		500			•	000		Š	0 700	000 200	00 0	700 1	90 3		100	700	100	100
01 6	003	9 000	000	000	000		000	000	000	200	000	•	200	3	000	•	000		ă	800	000	999 9	•			000			000
0 10	000	0 003	000	000	000		000 000	004	003	000	000	•	100	9	000	3	000		Š	000	000 000	000 0	•			001			000
01 F	000	000 0	000	001	000		000	000	000	000	200			9	000	•	000		ā	0 000	000 600	000 0	_	700	•	000			000
10	000	000 0	000	700	000	200 000	00 000	003	001	000	000		100	3	0 100	0 700	200		ō	0 000	000 500	0 00 9	\$ 003	~		000	500		500
3	000	0000	000	000	000		000	000	000	000	000			-	000	9	000		ā	0 000	000 000	000 0	9			000	004		000
× 10													•	S E															
A 10																	J	C 0 2											
PAH1/SUB		KE SPONDUK 201 202 2	UK 203	H 203 204 205 206 207	205	506	207	¥07	209	210	2117	212	213	214 2	215 2	2 917	217.2	218 2	2 612	2 022	227 122	2 223	3 224	4 225	426	127	822	424	2 50
0 1 A	YES	S	100	200 100	001	001	100	002	100	100	100		001	0 100	0 0 1 0	0 100	0 100	0 200	0 100	0 100	100 100	1 00 1	1 00 1	100 1	000	005	004	100	100
0 1	YES	ဟ		100	200	200	000 001	100	000	000	100		700	0000	0 000	0 000	0 0 0 0	100	ŏ	0 000	200 ngo	2 002	2 00 2	2 008	9 00 5	-00	100	500	000
01 C				000		000	000 000	000	000	000	200		000	000	0 000	0 000	0 700	000	ŏ	0 000	000 000	900 n	à	000	220	200	500	700	000
0 10		•		000		000	000	000	000	000	900		000	0000	0 000	0 000	0 000	000	ŏ	0 000	000 000	0000	0 003	3 000	000	003	000	000	003
6				000		000	000 000	003	700	000	100	100	000	9 000	0 000	0 000	0000	000	ō	0 000	000 000	000 n	9	000	000	000	000	000	000
10				003		003	000 000	003	003	000	001		000	0000	0 000	0 000	0 5 00	700	ā	0020	000 000	0000	0 004	000 t	000	000	700	000	700
) [0				000		000	00 000	9	000	700	000		000	000	0 000	0000	0 000	00	ō	0000	000 000	000 0	900 0	900	000	000	000	00	
×		M S																											
•										7 :: 0																			

######################################	
MHAI PEMEENI UF INF PERSUNNEL ASSIGNED TO INF PROJECT RECEIVED ADDITIONAL TRAINING IN THE PROGRAMMING LANGUAGE SELECTEU? ************************************	
MHAI PERCENI UF THE PERSUNNEL ASSIGNED TO THE PROJECT RECEIVED ADDITIONAL TRAINING IN THE PROCRAMMING LANGUAGE SELECTEU? ************************************	
MHAI PERCENT UP THE PERSUNNEL ASSIGNED TO THE PROJECT RECEIVED AUDITIONAL TRAINING IN THE PROCRAMMING LANGUAGE SELECTEU? ************************************	
MHAI PEMEENI UF INF PERSUNNEL ASSIGNED IN INF PROJECT RECEIVED. AUDITIONAL TRAINING IN THE PROCKAMMING LANGUAGE SELECTEU? ************************************	
MMAI PLHCENI UF INE PLHSUNNEL ASSIGNED IU INE PROJECT RECEIVED. ADDITIONAL TRAINING IN THE PROGRAMMING LANGUAGE SELECEED? ***********************************	
PHECKNI UP INE PERSUNNEL ASSIGNED IO INE PROJECT RECEIVED. 110NAL TRAINING IN THE PROGRAMMING LANGUAGE SELECTED? ************************************	
LENI UF THE PERSONNEL ASSIGNED TO THE PROJECT RECEIVED. 1. TRAINING IN THE PROGRAMMING LANGUAGE SELECIEU? ************************************	
UF INF PERSONNEL ASSIGNED IN INF PRINIECT RECEIVED: (AINING IN THE PRUCKAMMING LANGUAGE SELECTED? ************************************	1 210 211 212 213 214 215 216 217 218 219 220 221 222 223 4 200 000 090 090 001 050 050
ING. IN THE PRUCKAMMING LANGUAGE SELECTED? ************************************	040 000 000 000 010 010 010 000 000 050 05
LHSUNNEL ASSIGNED IN THE PHILIFOL RECEIVED N THE PHUCKAMMING LANGUAGE SELECIEU? ************************************	212 213 214 215 219 715 219 219 220 221 222 223 000 000 012 000 010 075 010 000 000 020 005 050
NNEL ASSIUNED IN 1814 PRINJECT RECEIVED: PRUCKAMMING LANGUAGE SELECIEU? ************************************	213 214 215 216 217 218 219 220 221 222 223 000 072 000 010 075 010 000 000 020 005 050
ASSIUNED IN THE PRINIFCT RECEIVED. JUKAMMING LANGUAGE SELECTED? ************************************	214 215 216 217 218 219 220 221 215 219 000 000 010 005 050
ILNED 10 THE PROJECT RECEIVED AMING LANGUAGE SELECTED? ********* 115 116 117 118 119 120 121 122 123 124 125 126 127 128 100 100 000 000 000 050 050 050 050 100 10	215 215 215 219 220 221 222 223 000 010 075 010 000 020 020 005 050
10 10t PKUJECT KECETVED: LANGUAGE SELECTED? ************************************	216 217 218 219 228 221 222 223 010 075 010 000 000 020 005 050
1Mt PKUJECT KECFIVED CUALE SELECTED? ************************************	217 218 219 220 221 222 223 075 010 000 000 020 005 050
**************************************	218 219 220 221 222 223 110 000 000 020 005 050
CT MECFIVED - CCIEU7	119 220 221 222 223 100 000 020 005 050
# CF 1 V F F F F F F F F F F F F F F F F F	eu 221 222 223 00 020 005 050
vti) 	21 22 223
22 123 124 125 126 127 128 00 050 050 050 100 100 100	22 23
** 23 124 125 126 127 128 10 050 050 050 100 100 13 224 225 226 227 228	20 0
4 125 126 127 128 0 050 000 100 100 4 225 226 227 228	25
5 126 127 128 0 000 100 100 5 226 227 228	5 90
0 100 100	2 22
1 128	0000
~ ~ ~	977 1
169 MIS	777
1 1 1 1 0 0 1 2 5 0 0 1 2 5 0	250

	MESPUNDUK 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	01 001 100 100 100 000 000 000 000 100 100 000 100 100 100 100 100 000 000 000 000 000 000 000 000 000 100 HIS HIS 100	RESPUNDOK 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230	01 001 000 MIS 100 000 100 000 100 000 010 010 010 01
	9	E n	7 8	70 0
	2	1	22 -	9
	91	0 10	52	50 05
	3	30 5	در	0 0
	3	70 0		90
*		900	5 22	0 05
WHAT PERCENT OF THE PERSONNEL ASSIGNED TO THE PROJECT REDUINED Additional training on the operating system that was used?************************************	71 7	5 o 5	5 25	0 1 0
a :	7 -	70 O	1 22	0.0
uu1k 0?**	71 0	S 0 2	77 0	20 0
WHAT PERCENT OF THE PERSONNEL ASSIGNED TO THE PROJECT REGULKED ADDITIONAL TRAINING ON THE OPERALING SYSTEM THAT WAS USED?****	21 6	E	22 6	0 0
MAS	=	00 0	2 2	000
P. F.	-	9	1 210	0.50
= = = = = = = = = = = = = = = = = = =	Ξ	000	217	000
573	Ξ	0 50	27.5	007
I CN	=	01	215	000
ASS	=	9	21.2	012
NAME OF STREET	5	0 5 0	\$15	000
t KSU	71	0 \$ 0	717	000
i S	Ξ	100	211	010
U TO I	011	000	210	010
Z X	601	001	508	050
PERC	106	100	208	100
141 5013	107	0 # 0	207	000
¥ ₹	9	000	902	100
	105	90	502	000
	104	100	707	990
		1 0 0	20 S	100
	HESPUNDUR 101 102 1	100	202	SIN
5	HE SP 101	100	RESPUNDOR 201 202 20	900
	308	001	SUB	100
QUE ST I UN	PAHT/SUB	5	PAKT/SUB	0

	93	4		9	ĭ	⋖	_		
	KESPUNDUN 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 125 124 125 126 127 128 129 150	SIA SIA	SZB	MESPUNDUR 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 221 228 229 250	SIA MIS SIN	∀ 1 S	118		
		S	'n	, 7 , 8	Ī	Į	2	د	
	1 16	SIMS		1 22	S	U5H	960	760	
	71 9	I S		7	Ī				
	21 0	SKO MIS MIS		22.	3				
	71 1	SK		22	I				
	77 1	Ï		554	Ï				
-	7	N .		78	is				
ACE	166	Z W		777	<u>-</u>				
IA It Int	171	S E		177	N E				
N N N N N N N N N N	120	S I H		220	N S				
X S S S S S S S S S S S S S S S S S S S	-	H S		414	SIN				
irs.	118	n T		218	SIR				
LO Y	=	316	S1.	417	SKA				
N	=	S I		216	31C				
IF II WEKE WITHIN YOUR POWER TO MAKE ANY CHANCES, OR INITIALE ANY Research in the area of Staffing, mhat would you consider the Host Fruitfol area for modification or study?	115	DHA MIS MIS MIS MIS SIE MIS SIG MIS SIH MIS MIS MIS MIS MIS		215	MIS X4J SKE STA STD MIS SIC SIC SKA STR MIS MIS SIF SIF MIS MIS SIE MIS	SKE			
S S S	*	S I		214	S I E				
AFF 1	113	SIN		213	STD				
FUN SI	112	SIA		212	▼				
700K	Ξ	SIL		=	SKE	STD			
N N N N N N N N N N N N N N N N N N N	9	5 -		9	3.	••			
# 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5	Y Y		30	. s = +				
# E E	8	13.		90		SIA			
IF IT WE HE SEARCH	1 20	HC P		6.4	0 4/	v ,			
- 1	3	316		7 90	1 S N				
	1 5	Z W	STB	2 50	=======================================	110			
	7 3	S.	'n	~ *0	0 11	9			
	03 1	2 H	3.2C	7 50	ر ا 3	STR			
	NUUN 02 1	15 8	s	NDOR 02 2	15 8	er.			
•	RESPONDUR 101 102 1	MIS MIS SZE MIS STM U7F SHC MIS		AESPUNDUR 201 202 20	SHD MIS SIJ SIE UTE MIS N/A UHC				
3 7			~			~ 1	~		
40E 3 I 1 UN	PAH1/SUB	01 001	01 002	PAHT/SUB	100 10	700 10	500 10	01 004	
aue:	7	ō	•	PARI	ō	3	5	•	

NESPUNDON PAMI/SUB 101 102 103 104 105 106 107 108 109 110 111 112 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 01 A 7ES 7ES 7ES 7ES 7ES
Say Say Say Say Say

	30000045 43	•																								
PARI/SUB		205 20	202 41	> 404	207	807	50₹	017	, 113	212	115 2	14 2	15 21	0 21	17 /	415 B	1 220	177	777	223	208 209 210 211 212 213 214 215 216 217 218 219 220 221 223 224 225 226 227 228 229 259	25 25	25 05	1 22	8 22	2 20
4 10	YES						Yt S				-	YES									rt s	Z	21.3			
9				YES					76.8						YES	SYES								, ·	TES TES	5 Yt S
01 C	J	£ 0 3									>	YES														
0 10		YES	ဟ	YES		YE S		xt s			٦	707		Y S	;n								¥.	YES YES	'n	
01 E	Y ES																									
9 10																								707	v	
10	YES		YES	,_		YES			YES						11:	TES TES TES	YES				YES Y	Yt S	YES	SYE	YES YES	
1 10	71.5	1	YES YES		YES	YES YES YES	Yt S	YES YES	YŁ S			¥.	YES	X F.	- AF 6	VES VES YES YES	YES	YES	YES YES		YES YES YES YES	ts YE	SYE	S YE	YES YES	3 11 5
P 10									~	NON NON	z 5		202	z						COX						

HUE STIUN 42	PANI/SUB 10	01 A 7E	9 10	RE PAHT/SUB 20	V 10	OI B YE
2	MESPONDUR 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 125 124 125 126 127 128 129 150	YES YES YES		HESPUNDOH 201 202 203 204 205 206 207 206	YES YES	% t 3
	104		16.8	204	_	YE S
	105		YES YES	205	Yt.S	
- 2 × C Z	90	YES		700	TES YES	
WAS A WUN DEVELOPME A. YES B. NG Z. CUMME	101		YES YES	207		YES YES
MAS A MUKK BE DEVELOPMENT? A. YES B. NG Z. CUMMENT	108		¥ £ \$	902		YES
413 413	601	YES		209	Y & S	
WAS A WUKK UMEANDUWN STRUCTURF COOF USED IN THE CONTROL OF SYSILM DEVELOPMENT? A. YES H. NG A. CUMMENT	110	YES YES YES YES		052 622 822 122 922 522 622 522 222 122 022 612 812 112 912 512 512 512 512 112 012 602	YES YES	
<i>∞</i> 2	===	YES		,	YES	-
LAUC	1 211	YES.		212		YES YES
T. K.	113	res	_	315	-	rt s
COD	1 4 1	>	YF S	7 7 7	YES Y	
ust	15 1	YES YES		15 2	YES	>
2	1 91	£ S	>	16 2	Ē	74.5
Ĭ	1 23	Z	¥ 5	17 21	ES YI	
W00	11 81	71 S	T.	18 21	k S 7 f	
TKOL	21 61	7,	Yt S	22 61	VES VES YES YES	
** **	71 Oi	Yt. S	Y £ 5	22 0	S.	YES
rsft	71 1	¥.	'n	77 1	*	د دد
Ł	717	YES YES YES YES YES		2 22	YES YES YES	
	> 15,6	SYES		122 8	SYES	
	571 1	× + 5		527 1	••	2 2
	126	74.5		770		11.5
	121		×1 ×	127		TES TES
	871		YES YES YES YES	428	rt 5	
	164		¥1.5	627	Y S	
	1 50		x 1 x	250		Yt 5

						= 4 \$0 0 M T > 4	⊋ x	- 3245- 35	THE CHAIN? PUNT 111LE LYAMDNINLY ECT STATUS 1FICANT CHE VS PERFORE JUNKNUMM (1	THE CHAIN? PURI 111LE LYMBNIHLY ACTIV ECT STATUS 1FICANT CHG VS PERFORMANCE /UNKNUWN (ADDED)	F AC S HIG HMAN (ADD)	HE CHAIN? UMI 111LE YAMDNIHLY ACTIVITY CT STATUS FICANT CHG VS PERFORMANCE (AUDED) UNKNUWN (ADDED)	TY NODE I	OKTC OKTC	UI LOME ST UPLIGINATOR	¥		# C I	HGM ST MECIPIEN	THE CHAIN? LUMEST LUMEST HIGHEST HI	3 d	us uu, ut Aubs/kuts	<u>n</u>							
PAR1/SUB		RESPONDOR	103 103	104	105	901	101	108	104	110	Ξ	KESPONDUR 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 127 128 129 130	113	= =	115	9 ! !	1117	911	611	120	151	1.55	1 52	54 1.	51 S2	9	7 120	151 8	051	
۷ 10	M CK	CPR	FLS	ĭ	CPA	CFR	CPR	CFR	1	3.	7. H.	MUR CPN FLS PMR CPA CPN CPR CPR CPR CPR CPR FLS	FLS		FLS	FLS PMS LSE		71:5			\$14	1	PMS CPA	4		ż	CPK PMK	~		
9 10	118		PRE	PR	3	447	7 SA	***	X X	HAG	PEN	PMK PMK PMK LVA LSA PMK PMK PMK PEN LSW PLS	511		Y Y	PEN PAS PAN	E I				11.5	•	PMS CPA YES	4	'n	٦	CPH PMH FLS PMH	ï	T MH	
O 10	J Z					CPR		FLS	FLS PMK				FLS		z 1		J E			_	+1.5		ت	CPA		CPR	x			
o 10											SAC																			
N 10																				S E	_	S E			n T	n				
٠ ١														N C N					NON											128
PART/SUB		KESPONDOH 201 202 2)H 203	204	KESPUNDUH 201 202 203 204 205 206 207 208	707	207	208	209	210	7117	209 219 211 212 254 255 256 257 255 155 055 415 316 216 216 217 218 215 217 217 218 229	213	214	215	216	217	218	414	220	122	7 77	25.2	24 20	25 22	\$ 5 5	1 221	424	250	
A 10	S. F.		ENG	ENG FIC	CPK	CPH NON		+1.5	FNG	FLS ENG LSE	C.P.R		FLS		FLS		FLS CPA	C P A	MUK	dH.J	NOK.	WUN CHP WUN FLS FLS	r s	I	FL3	\$14	NOM S	¥ CK	F1.5	
1 O	J Z			f 1C	FIC CHP PMR CPR SPC	T.	CPR	SPC		ENG PEN SPC	SPC			CPK PLS	118		T W	CPA	FLS	P. M.	X X	1.5	1 51	St 13	PMH CPA FLS PMR PMH FLS FLS LSE FLS LSE	PMK	ž	MUK FLS	MCP	
) lo				† 10		¥0	CPR	MUR CPH FLS	t NG		+1.5						ĭ			_	¥ ¥	UK F	PMH WUK FLS LSE FLS	14 45	တ	ĭ	Ž Z	\$ FLS	NUK FLS MCP	
x 10		<u>s</u>																												
0 1 ¥												NON				Z S														

PARI/SUB		HESPONDOR 101 102 10	30K	104	501 1	HESPONDOR 101 102 103 104 105 106 107 108	101	108		109 110	=======================================	112	113	7	115	111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	111	8	5	120	171	1.22.1	25.1	7 72	1 57	7 77	- 12	78 1	2	051
0 2 A	Ţ	Ĭ	PHK PHK PHK	- MCF	TO T	MCP MGR MGR VPG PMR	VPG	T	J X	ĭ	3 2	F ST	X CX		VPG	VPG	T X	YES		_	H H	-	r MK	J X		7	7 X	VPŁ		
9 70	ĭ	-	VPC	, MC	E E	VPG ИСР МСК МСК		VPG MCK	T X	ICK	X.	S H S	ž,		V P.C.	0,00	T X			_	Y.	_	0.00	Y MK	Yt 5	7	7 X V	VPt. r	T XX	AC F
) 70	PH	-				Ţ		MGK	J.				MCK		VPG	_	T X			_	MGK		_	Ŧ		•	PMK			
0 70											7. 2.																			
x 70																				M IS		<u>η</u> Ξ			Σ	SIW				
0 Z														C 0 1				2	Z S											
PAN1/SUB		RESPUNDUR 201 202 20	2UK 2 ∠03	1 204	1 205	MESFUNDUM 201 202 203 204 205 206 207 208	207	208	_	210	211	212	213	214	215	082 452 852 152 955 455 455 552 552 155 055 415 815 115 915 415 815 815 816 817 818 018 408	117	81:	61	022	5.1.6	2 2 2 2	2.8.2	5 45	\$ 5.5	₹ 92	2 12	7 97	, 1	50
02 A	Ţ		ĭ	Ţ	a a	PHK PHK PHK		ĭ	000	r z	FL 5		J X		J.	_	X SK	MCK	VPL	7 X	T XMT	T X X	T X	7	T X	>	vPG F	T X X	T X	¥.
9 7 O	# EK	~		V PG	PAK	_	ĭ	APC.	000	Z Z	Z ¥			FLS	იეი	_	MCR	MGK	VFG	VPG	VPC+	PMK PMK		FLS P	T XMT	X X X	V 204V	VPC P	F H X	7 P.6.
) 70				VPG		Ţ	PHR PHR PH	A T	Z MS		P.					-	MCK			•	VPL	FLS PMK	X	FLS P	PMH	>	v PG v	VPC P	Y W X	۷ ۲
× 70		N																								•				
0 ×												NON				NON														

104 105 106 107 108 109	MESFUNDUM 101 102 103 104 105 106 107								104 110	0		=	112	-	111	;;	-	=	11 /	=	150	171	122	125	124	125	126	121	971	۲۷	1 50
0 8 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	005 003 001 001 005 000 000	005 003 001 001 005 000 000	005 003 001 001 005 000 000	005 003 001 001 005 000 000	001 005 000 000	001 005 000 000	001 005 000 000	001 005 000 000	000 000	000 000	000	_	000	_		700	700 t	7 00 4	res			00		00))			3 3 3		
03 B 002 000 001 002 002 001 005 005 005	200 200 200 001 002 001 005 005 005	200 200 200 001 002 001 005 005 005	001 002 002 001 005 005 005	001 002 002 001 005 005 005	200 200 200 100	200 200 200 100	200 200 200 100	200 200 200 100	200 200 200	200 200	700		000	_		00	\$ 005	700 7	21			00		000					900		100
03 C 000 003 001 005	608	608						200 100	700							200	٦.	200	٠,			100									
000	000	000	000	000	000	000	000	000	000	000	000	-																			
v * 0																					S E		2 .				Z Z				
0.5 Y NUN	NON	NO.	NUN	NON										200	1 0 J	_				NON	,				N O N			NO.		Z	
MESPUNDUR PAHI/SUB 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215	HESPUNDUR 201 202 203 204 205 206 207								209 210 211	210 211	211		212	~	1 214	\$1.2 2	12.5	77	7 218) 22 (082 622 822 122 925 527 622 522 522 122 022 612 812 112 912	555	577	224	577	326	122	428	622	~
03 A 000 000 001 000 000 002 001	200 000 000 000	200 000 000 000	700	700	700	700	700			100				008	-	005	:n	00	001 003		2 00	000 100 900	005	001				100	100	700	
03 B 002 001 000 001 001	100	100	100	100	100	100	100			100					001	1 006	۵	000	000	500 9	100 5	100	200	00			100	100	900	199	
200 000 200 3	900	900	900	900	900			500										000	_			001		100 100				100	000	100	
03 x MIS	MIS																														
NON NON A 50									NON	NON	NON		NON NON	-			NON	2							NON	NON					100

HAND COMMINION NOT CHARGE SAC LING TESS NOT THE TOTAL NOT THE SAC SAC LING TO THE TOTAL NOT THE SAC SAC LESM ENG. HIS MIS MIS MIS MIS MIS MIS MIS MIS MIS M
#15 M15 M15 M10
FF S FF S
206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 227 228 229 230 muh SPC CPH FLS CPH CPK FLS AK PK HLS AM MUH MUH MUH MUH MUH MUH MUH MUH MUH MU
206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 227 228 229 230 muh suk spc (Ph FLS (Ph CPK) FLS suk shik muk spc (Ph FLS (Ph CPK) FLS suk shik suk shik shik shik shik shik shik shik shi
CPH SPC CPH CPK FLS FLS MUK
SPC CPH FLS CPH CPK FLS PLS NUM
SIH

WHICH AUTOMATED REPORTING SYSTEMS WERE USED IN PROJECT MONITORING. AND MANAGEMENTS

UUESTIUN 94

AUE STLON	& ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	MUNITORING SYSTEM DEVELUEM LUUNI CUMPLLES PER MUDULE CUUNI LINES OF CODE PRUDU CHECK FUR ADHERRICE TO CO CHECK FUR USE OF STANDARD PERFURM MANHOUN/CUST ACCU CHECK PERFURMANCE (ADDED) MONITOR CHANGES (ADDED) DID NOT USE SUFTMAKE TO R OTHER	UNITORING SYSTEM DEVELUPMENT, SYSTEM SUFTWARE WAS COUNT COMPLES PER MODULE COUNT LINES OF CODE PRODUCED CHAIR LINES OF CODE PRODUCED CHECK FOR ADDIT REAL OF STANDARD DATA LLEMENT NAMES PERFORM MANHOUN/COST ACCOUNTING (ADDED) CHECK PERFORMANEE (ADDED) MODIT CHANGES (ADDED) DID NOT USE SUFTWARE TO MODITOR SYSTEM DEVELOPMENT OTHER	UF TWAKE WAS USED TUTONS NAMES) UF VELUPMENT	. O	
PANI/SUB	HE SPUNDUM 101 102 103 104 105 106 107 108		521 121 021 611 811 711 011 511 111 111 111 111 111	117 118 119 120	इरा भरा इरा हरा १२१	123 124 125 126 127 128 129 130
V 10					YES YES YES	
9 10	YŁS		YES		YES YES	
01 C	YES YES	rt s	1 s	Yts	YES	
a 10	YES YES	YES	X \$ 2		YES YES	
01 E					707	
9 10						707
v 10				SIE		MIS MIS
٥١ ۲	NUN NUN NUN NUN	NUN NUN NUN NUN	COL NON	NUN NUN	NUN	NUN NUN
2 10			H10			
PART/SUB	HESPUNDUR 201 202 203 204 205 206 207 208	1 209 210	211 212 213 214 215 216 3	217 218 219 220	125 255 655 855 855 575 125 055 815 815	052 422 422 230
0 1 A		7t S	ø		YES	YES YES
01 11		YES YES		Y+ S		YES
J 10		YŁS		YES YES		
0.10		YES YES		YES YES YES	•	YES YES YES
0.1 F					207	
3	Yts					
× 10	CPR			1		
V 10	NON NON NON NON	NON NO	NUN NON NON NON COS	NON	NON NON NON NON	NUN NUN
7 10	H10	01 H				

	08 1 62 1 80						SIE	NON NON		08 2 84 6 80	201 201					N C
	1 121 921 52	703	C 0 2				E SIE	NON		2 250 251 2						NON NON NON NON
A	KESPUNDUK 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 150	707	C 0 5	C 0 2	Yt S C 0.2	C 0 2		202	01H	082 452 858 755 855 855 855 855 555	C02 C03	20:3	C 0 2	70:3		ž
UCHAM CHUICS TEU TASN, C IUNALLY NAKH	1 121 021 61			02	Ē		SIE	NON N	5	219 220 221 2		3			N N	NO NO
LIST PRUDUCTIVITY INDEXES SUCH AS LINES OF CUDE, PRUDHAM FRENKS, SUURCES OF ERRUKS, TURN AROUNDS RETUTED PER COMPLITED TASK, FTC., INAI MENE EMPLOYED IN MUNITURING PERFORMANCE, (ORIGIONALLY NAKRATIVE) A. LINES OF CUDE (PER UNIT OF TIME) B. MUDULES COMPLED (PER UNIT OF TIME) C. PROCHAM ERRUKS D. COMPUTER TIME USED E. DOCUMENTED PAGES Y. DID NOT USE PRODUCTIVITY INDEXES	16 117 118 1			C02 C02			MIS	NON		218	C 0.2					O S NUN NUN
PRUDUCTIVITY INDEXES SUCH AS LINES CES OF ERRURS, TURN ARGUNDS RETUTED MENE EMPLOYED IN MUNITURING PERFOR LINES OF CUDE (PER UNIT OF TIME) MUDULES COMPTLED (PER UNIT OF TIME) COMPUTER TIME USED DOCUMENTED PAGES DID NOT USE PRODUCTIVITY INDEXES	13 114 115 1	. 20		C02	C02		Í	COI NON		715 915 517 813 513 717 518 517						NON NON NON NON NON NON NON CO S
PRUDUCTIVITY INDEXES SUCH AS LINETES OF ERRURS, TURN AROUNDS RETUINE WERE EMPLUYED IN MUNITURING PERFLINES OF CUDE (PER UNIT OF 11ME) HOUGHLY COMPLED (PER UNIT OF 11ME) PROGRAM ERRURS COMPUTER TIME USED DOCUMENTED PAGES DID NOT USE PRODUCTIVITY INDEXES	10 111 115 1	503 CO3 CO3 CO3	CO2 CO3	J	J				•	5 217 112 DI						IN NON NON NO
LIST PRUDUCTIVITY INDESCURES, TOW EMBURS, TOW THAT WERE EMPLOYED IN A. LINES OF CORPILED (C. PRODUCEN HERURS) C. COMPULE TIME USED COMPULED (C. DOCUMENTED SED COMPULE TO SED COMPULE TO SED	1 108 109 1	ت	J					NON NON NON		7 208 209 2	707					
118 118 118 118 118 118 118 118 118 118	4 105 106 10	203 C03	C 0 2	C 0 2					200	4 205 206 20						NDK NON NON NON
	RESPUNDUR 101 102 103 10	CO2 CO2		~	21	~		NON NON		RESPUNDUR 201 202 203 204 205 206 207 208	200				UNK	
aut stion 46	RE PAKI/SUB 10	01 A CO	9 10	01 C C05	010 005	01 6 602	× 10	01 Y	7 10	RE PART/SUB 20	01 A	01 B	01 C	01 E	× 10	01 Y NON

RE SPONDUR	3,	3		4	4	. 601		-	9	=	3	-	1	-	051 PC 1 PC	-	2	3	3	2	1.24	3	3	2	<u> </u>	<u>.</u>
YES YES YES YES YES	YES YES YES YES	YES YES	YES YES YES	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2 1 A	. s		YES Y	71.3	: :	:	:	At S	S 71. S		•	:	¥ £ 3		7 t s	YES YES	¥1.5	; =	YES Y	7ts	
VES YES YES YES	YES YES YES	YES YES	YES YES		-	-		YES Y	YES YE	res res	Ś		YES	SYES				YES	•	¥ t s	Yt S	Y s	=	YES Y	Yt S	
TES YES YES YES Y	YES YES YES	TES YES	TES YES	YES Y	YES Y	F.S. 4		YES Y	YES YE	YES YES	ø		YES	s Tt s				X + S		YES	YE S	s II	Ξ	YEST	7. S	
YES YES YES YES				44.8	7 t 3	30				¥	YES		YES	SYES			YES	s rts		YES	YES	YP S	Ξ	YES Y	YES	
YES YES YES YES YES	YES YES YES YES	YES	YES	YES	'	'	3	YES YES	£ 3				YES	SYLS				¥ \$			YES	Yt s	7	YES	TES YES	'n
YES YES YES YES YES YES	YES	YES					63	×	27					YES				Yt S			YES	¥ 5	Ξ	Yt S	Y1 S	s
																	Z03	~								
																	C 0 2	~								
																						Σ	W I S			
€05	C.0.2	C02	C02	€05	:02						C 0 5	2 C01			203 203 203	02 20	~		S							203

04 MAS NUME

0 **5** USER

UZ COMPANY

> PRUJECT MANAGE H

STANDARD
DATA NAMES
COUTING
PRINT

PRUGRAMMING DUCUMENTATION

TESTING MANAGEMENT REPORT (ADDED) CONFIGURATION CONTROL (ADDED) COALITY ASSURANCE (ADDED) NO STANDARDS (ADDED) UTHER

SPECIFIC STANDARDS EMPLOYED DURING THE COURSE OF THE PROJECT WERE DEVELOPED, ADAPTED, OR DIRECTED HY: 1

QUESTION 97

PART/SUB	KESPUNDUK 201 202 203 204 205 206 207	1 204	205	206		902	208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 25 24 256 215 215 216 219 259	211 216	2 215	214	2 51:	16 21	1 21	517 B	977	177	777	577	2 423	25 65	şe 22	1 22	b 24	9 250
4 10	7 k S			Yts		TES TES	16.8		¥ 5		ES Y	VES YES YES YES	2 2	SYES			s 1	vt s				*	res ves	25
£	74.5	YES	YES YES YES	rt s		YES YES	. s a.		x t s		t S Y	YES YES YES YES	3 YE	S YES			Yt S	TES YES YES	. r. s		44.8	'n	¥ 2	2
) I O	YES	¥ + S	YES YES YES	YES	_	YES YES	YES		YES		YES YES	S	YES	en.			X 1 S	TES YES YES	rt s		YES	'n	X 1 S	'n
0 10	YŁS	YES		YES		YES	Yt S		YES		YES YES	ES YES	ຫ			¥ 5	YES YES		Yt S	7	yt. S			
10		YES	YES YES YES	Yt S		rt s	YES YES YES		YES	_	F 8 4	YES YES YES	တ	Yt S			TES YES YES	YES	rt s		7.6	SYE	s Yt	YES YES YES YES
9 10		YES	YES YES			rt s	YES YES YES	YES	YES								Yt S			Ţ.	rts rts	'n		76.5
9 10	70 0																							
× 10	8 1 1 8							MIS	(0															
	C 0 2				C 0 2					C 0 2					C 0 5				J	C 0 2				

PAM I /SUB	RESPUNDUR 101 102 103 104 105 106 107 108 109 110 111 112 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	701	1 50	1 90	07 1	# 9	20	- 01	-	1 71	1 5 1		<u> </u>	0 111	118	2 -	120	171	1 771	25 1.	24 12	, 12	121 9	128	671	1 50
₹ 70										ī	Yt s				YES				7 t S							
0 & ts										¥	Yt s				71.5		11 S		rt s							TF S
) 70			_	YES						¥	YE S				YES			YES	rt s							YES
0 70			_	YES		_	YES Y	Yt S		¥	YES		YŁ S	ဘ			YES	Yt S	Yt S							YES
0 2 t	YES									7	Yt S		X F S	s				YES YES	rt s							YŁ S
02 F	YES	¥ E S	_	¥ + S								F	YES YES	'n				41 S	-	¥ s						2
02 6			J	C 0 2													C 0 2									
H 20																	203									
x 70																						N N	တ			
02 Y	C02	J	C 0 2	Ç	C02 C02	203		C	C 02 C	C 0 2	ت	100		C 0 2	٥.	C 0 2				Ü	CO2 CO2	y	(0)	201 201 201	707	
PART/SUB	HE SPUNDOR 201 202 203 204 205 206 207 208	204 2	\$ 605	7 90;	2 70	2 40	2 602	210 211		12 2	13 2	14 21	15 21	212 213 214 215 216 217	7 218	61 ₹	052 622 822 122 922 522 822 522 222 122 022 612 812	221	222	2 8 2	24 25	? ?	6 22	828	422	250
0 A																	YES						xt s			x t s
02 B																	YES							YES		7.
3 20																¥1.5	YES YES					YES	'n	YES		7 t s
0 70						_	YESY	YES YES	t s						YES	YES	7 t S				Ï	Yf S	Yt s	rt S		rt s
02 t								>	Yt S						Yt S	YES	YES.				Z	Y1 S				11 S
02 6					_	YES									YES	YES YES			-	rt s	_	¥t s		71.3	YES	
02 н	703																									
x 70	2 I								Σ	S I E																
02 Y	-	CO2 CO2 CO3) 70%	202	70					J) Z0	.⊃ C	02 C0	203 CO3 CO3 CO3 CO3	~			CO2 CO3	203	J	C02					
7 70	O TH																									

PAHT/SUB	MESFONDOM B 101 102 103 104 105 106 107 10	- 0 2	104 1	1 50	90	107	901	- 60	1 0 1	=	12 1	13 1	1 4 1	11 41	0	1 1 1	8	17 I 6	121	126	08 109 110 111 112 113 114 117 110 111 110 110 121 122 123 124 125 126 127 128 129 150	124	125	120	121	128	-	2
4 50																			76.5	i Yt S			Yt S					
0 5 B				_	YES															YES								
0 8 C																				Y 1 S								
0 \$ 0	YES								-	YE S				#	YES YES	SYES	so.	YES	· .	YES	.=		Yf S				_	113
03 £	y £ 3								_	YE S				YES	တ					YŁ S								
0 5 6									~	YES				YES	ဘ													
x 50																								S I				
03 Y	COS COS COS COS COS COS	1 70:	:02 C	05 () 70:) 70:	~	C02 C02	20:	J	CO2 CO2 CO1	Ú 7 0	01 CO2	20			C 0 2	N.			CO 2	C02 C02			C02 C02	C02		
PAN1/3UB	HESPUNDOR B 201 202 203 204 205 206 207 208		204 2	9 50	902	. 70s		508	209 210 211		212 213		214 2	215 21	6 21	1 21	,1 Z 9	9 22(122 (577	216 217 218 219 220 225 225 225 226 226 215 215 215	224	225	978	122	228	ru.	229 230
0 S A		_	YES YES	. 83	16.5			_	YES Y	YE S																		
0 } R						_	Yt s	_	YESY	YES																		
03 C						_	YES		_	YES																		
0 8 0						_	YES					Ē	YES								YES						_	YES
03 t						_	Yt S		_	YES		Ē	Yt. S															
0 5 4														Yt s	S											rt 5		
X 50	RIS									I	SIN																	
V 40	C 0 2				_	C 0 2	J	C 0 2			ت	C 0 2	ٽ	C 0 2	00	00 ₹	0) Z	CO2 CO2 CO2 CO2 CO2	?00 Z	, C0	۵.	C 0 2	CO2 CO2 CO2	C 02	C 0 2			
7 50	3	ОТН																										

PANT/SUB	MESPUNDON 101 102 103 104 105 106 107 1	107	108 109 110 111 112 115 114 115 116 117 118 119 120 121 122 125 124 125 126 127 128 129 150	10 11	1115	115 114	1115 11	0 117	118	1 61	20 121	152	125 16	34 125	126	1 121	451 BS	1 50
4 40	#	YES YES		Yt 5	'n			X		Yt S Y	s #							
12		16.5						YE S	-	YES								
) #O		16.5						X 5 3		YES								
3 70		YES							_	¥1 S								
3 FO		YES						x	X+S	¥ F S								
4 70		Yf S						¥	Yt S									
3		203						C 0 2	502 502 502	20.								
3		C 0 2						C 0 2	CO2 CO2	20:								
* * * * * * * * * * * * * * * * * * *															<u>n</u>			
5	COS COS COS COS		COS COS COS	203	05	103 203	COS COS COS COS	~			700	N SN	COS NON COS COS COS	200 20) 707	203 203 203 203	707
PAK I 75UB	HESPONDUH 201 202 203 204 205 206 207 21	06 207	8	209 210 211 212	! 215 !	115 214	215 214 215 216 217 218 219 225 225 225 225 226 219 215 215 219 219 219	18 287	218	2 617	50 221	777	22.8.22	577 117	226	2 127	45 249	250
A #0		7£ S				YE S	,							Y I S	YES YES			
20		YES				YES	:0							Yt s	YES			
J #0		YES				YES								YES				
0 40		Y																
04 E		Y£ 3													41.5			
4 40		Yt s				YE S	6			>	YŁ S							
x 70	SIN				<u>x</u>													
7	CO2 CO2 CO3 CO3	0.2	CO2 CO3 CO3	.02 CO		707)) 70)	COS COS COS COS	C 0.5 (₹00	70 0	200 5	COS COS COS COS	~0	•	C 0 2 C	203 COS COS COS	(0 5

00 PAHT/SUB 01 A 01 B 01 C 01 C 01 B 01 C 01 D 01 C	46 MESPUNDOH 101 102 103 YES YES YES YES YES YES	6 mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm	104 10 VES YES YI YES Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y	MES YES YES YES YES YES YES YES YES YES Y	MHICH DE VELCE C. P.	MHICH OF TOP WE ALLED PHELING C.	HOF THE FULL STEEL	THE FULLUWING METON IN THE FLUNT (AFK MENNIS DEFINITION MENNAY DESIGN (ADDED) HE NITE GRATION HE INTE GRATION HE NITE GRATION HE NIT	HULLUWING FULLUWING NIS DEFINI NIS CADDED) NIS CADDED) NIS CADDED) NIS CADDED) NIS CADDED) NIS CADDED NIS CADD	THE FULLOWING MERE REPRESENTED TO THE FULLOWING MERE REPRESENT (ADDED) HE DESIGN (ADDED) HE SIGN (TVIOLE STATE OF THE STATE OF TH	THE FULLOWING MERE RECOGNIZED M DEFINITION HENNIS DEFINITION HENNIS DEFINITION HENNIS DEFINITION HENSIGN (AUDED) HENSIGN (AUDED) HENSIGN HE	1115 11 115 1 115 1 1 1 1 1 1 1 1 1 1 1	#E CUG: #E CUG: ##E C	117 118 76.8 76.8 76.8 76.8 76.8 76.8 76.8 76.8 76.8 76.8 76.8 76.8 76.8 76.8 76.8 76.8 76.8 76.8 76.8 76.8	10N ADDED) DIVIDED INTO (RECUGNIZED) PHASES IN THE ADDED) AS YES YES YES YES YES YES YES YES YES YE	PHASES (PHASES (PHASES (PHASES (PHASES (PHASES (PHASES (PES (PES (PES (PES (PES (PES (PES (ADDA TO THE STATE OF THE STATE	THE STATE OF THE S	12	# # # # # # # # # # # # # # # # # # #		4	~ a aaaaaa	** ** ** ** ** ** ** ** ** ** ** ** **	சுவ வக்கை வக்கை வி
										C 0 2																
z 0	res	YES YES YES YES	£3 Y	E 39	r s	Y.	SYES	vo			Yt S		ves 1	16.S Y	x + s			YES	s xt s	YES	x t s	X S	>	YES Y	YES YE	n
																	H 0	I								

900 700 400 700 500 500

	128	700	700	200	200	700	700		
		100	003	700	000	700	700		
	151 971 571							2	
	125	100	700	200	100	700	100		
		100	001			008	00		
	123 124	003	100	200	005 001	003	003		
3	771	200	100	500	400	900	500		
A	121	500	100						
e C	221 121 021 611	100	100	500	200	700	₹00		
3	611	≥00	200	₹00	₹00	200	700		
	118	100	100	100	100	100	100		
•	110 111 112 113 114 115 116 117 118	500	500	500	0.04	700	900		
	116	100	100	100	004 004		200		
ê	511	700	700	700	500	100 £00	200		
SX X K LA K	7	900	900	900	500	900	900		
10 In	115	003	500	000	900		900		
ASSIGNMENT ACTION/FREQUENT WE'RE FASK ASSIGNMENTS TO THE PROJECT ILAMS GIVEN IN WRITING? WRITING? WRITING? WRITING TO MITH EACH WRITING TO THE TASK ASSIGNMENTS PREPARED IN SUCH A WAY THAT THE REALIUNSHIP OF THE TASK TO THE PARED OF THE TASK ASSIGNMENTS WRITING? WE'RE TASK TO THE PARED OF THE TASK ASSIGNMENTS WRITING? WE'RE TASK ASSIGNMENTS GIVEN TO INDIVIDUAL TEAM MEMBERS IN WHITING? WE'RE TASK ASSIGNMENTS WRITING? WE'RE TO THE TASK TO THE WE'LL THAT WE'RE TASK ASSIGNMENTS WRITING? WE'RE TO THE TASK THE TASK THE TASK OF THE TASK	711	500	100	003	\$00	001 006	003		
ASSIGNMENT ACTION/FREQUENCY WERE TASK ASSIGNMENTS PROJECT ILAMS GIVEN IN WEITING? WEITING? WEITING? WEITING? WEITING TO THE TASK ASSIGNMENTS PREPARED IT A WAY THAT THE RELATION THE TASK TO THE NEX MITTEN TO THE NEX MERE TASK ASSIGNMENTS TO INDIVIDUAL TEAM MEM MERE TASK ASSIGNMENTS TO INDIVIDUAL TEAM MEM MERE TASK ASSIGNMENTS TO THE NEXT TO THE TO THE TO THE NEXT TO THE TO THE NEXT TO THE TO THE NEXT TO THE TO THE	::	_	_						C 0 2
SIGNMENT ON/FREQUENCY TASK ASSIGNY OF CIT LEANS GIVE ING? ON THAT THAN THAN ON THAT THAN THAN ON THAT THAN ON THAT THAN ON THAT THAN ON THAT THAN ON THAN	0 1 1 0	500	200	500	700				
CONTROL OF STREET OF STREE		200	200	003	700	100	200		
ASSIGNMENT ACTION/FREQUENCY WERE TASK ASSIGN WRITING? WALTING? WALTING? WALTING? WALTING? WALTING THA THA HE WALTITEN TEAM WALTITEN TEAM WHITTEN TASK TO TE THE THAT THE HE THE TASK TO THAT WALTEN TASK ASSIGN WERE TAS	108	200	200	500	700	700	500		
× v	601 901 201				100	001	900		C 0 2
- 4	106	200	005	100	200	200	100		_
	105	700	700	700	700				
	701	400	100	500	005 000 000 005	000 900	700 900		
	± 0 ≥ 0 ≥ 0 ≥ 0 ≥ 0 ≥ 0 ≥ 0 ≥ 0 ≥ 0 ≥ 0	500		004 002 005	900				
	UNDO 102	200	200	004	200	200	004		
	HESPUNDOH 101 102 103 104	001 005 005	200 100	100	500	100	00100		
unt salar	PART/SUB	0 1 A	01 B	0 I C	0 10	01 E		× 10	01 Y
	Ą	•	•	•	-	•	•	•	•

PAHT/SUB	MESFUNDUM 201 202 203 204 205 206 207 20	0 7 7	\$ 204	502	70¢	707	20	50%	210	711	717	215	214	212 213 214 215 216	7 91	2112	218 219	4 220	77 0	221 122		225 224	577	226	127	228	554	250	
۷ : ٥	500		005	00 900 200 600 500	005	900	-	200	00 \$	100	200	000	900	0 700	0 900	0 600	900 500	004	4 002	2002	700 Z	003	700	00	900	200	700	500	
9 10	700		00	00 500 700 100 100	₹00	900	00	100	200	700	100	500	200	0 700	0 900	0 700	0 0 S	200	200 Z	2002	200 2	100	200	20	00	001	700	400	
01 C	900		001	200 200 100	₹00		100	100	\$ 00	700	900	900	900	700	9	0 500	₹00	700	2 00 5	\$ 004	1 003	000	700	700	00 5	700	00	005	
9 10	500		005	00 900 500 500 500	005	900	4	700	900	700	200	900	900	0 0 4 0	0 900	0 500	900	004	4 005	ት ሀሀን	5 004	004	200	605	005	603	003	500	
9 10	700		609		005		100	700	700	700	200	900	J	700	ō	0.02.0	200	0.02	A.	005	000	001	200	200	00 5	200	700	005	
01 6	900		005		₹00		001	700	000	700	900	900	•	004	ō	0 500	905	005	~	005	005	004	700		00	00 0	00.5	005	
x 10	H I S	HIS HIS	,																										

¢	
•	
•	•
3	
3	
:	
3	
Ĭ	
=	
2	į

WERE TASK WUHR TIME ESTIMATES PRUVIUED AT THE UTTASK ASSIGNMENT OR DID INDIVIDUAL TEAM MEMBERS PROVIDE FIME ESTIMATES AFTER REVIEWING THIS ASSIGNMENT?

A. TIME AND TASK ASSIGNED

H. TIME AND TASK ASSIGNED WITH "ERIFICATION OF MUDIFICATION UP TIME

TIME AND TASK ASSIGNED THE VERTFICATION OF MODIFICATION OF TIME ALLOTTED HEING PROVIDED BY INDIVIDUAL THAM MEMBER AS A MAITER OF PROCEDURE

INDIVIDUAL TEAM MEMBER PROVIDED THE TIME ESTIMATE FUR FACH TASK ن.

NO EFFORT WAS MADE TO DETERMINE TIME REGUINEMENTS FOR INDIVIDUAL TASKS ASSIGNED

Ž YES TES TES YES YES YES YES YES YES YES ¥ t S Yt S Y E 5 X t s Z 7.6.5 NON NON YLS YES YES Z yt S YES YES Yt s YES Yt S YES YES ۷ 10 0 1 V 0 1 0 0 1

YES rt s YES YES YES YES YE S YES YES YES Yt S Yt S YES YES YES TES TES TES 4 10 9 10

YES

C 0 5

765

YES YES

۲ ۲

YES

YES YES Yt S 0 10

SIN SIN x 10

UUESTIUN 101	7	MISAI	INIERVALS	ntre	IASP
	•				

AT WHAT INTERVALS WERE TASK ASSIGNMENTS MADE TO INDIVIDUAL ITAM	nt Ht	IASK	ASSI	NME NES	MALIE	2	DOINTON!	AL IFAM
ME MINE MS								
A. EVENY 5 WORK DAYS	SAV							
B. EVERY 10 WURR DAYS	UAYS							
C. EVERY MONTH								
D. AS TASKS WERE DEVELUPED AND DEFENED	DE VEL	0140	AND	IF SNFD				
E. AS HESOURCES I	ECAME	AVA	LABLE	TOM OF	S CK	Ī	IASK	
Y. IASK ASSIGNMEN	I NOI	MAUE	9	JOI VI ON	JAL II	AM	MEMBINS	(AUDED)
4. OTHER								

PAR1/SUB	HESPONDON 1 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 150	104	105	106	101	108	105	1	Ξ		. 11	11.	-	2 11.	11 9	7 111		21 h	0 12	12.	21	124	125	126	121	128	129	1 \$0
9 10												YF S	υn															
J 10						YE S	-									Y E S	27						Yt s					
0 10	YES YES	YES	YES	VES YES YES YES	YES		YES	s ves	s YES	an.	YES	øs.					YE S	SYE	YES YES	. YE	YES YES	YES			Y IS	¥ E S	Yts	YES YES
01 E	YES YES YES	ອາ		YES	YES YES								YE	YES YES	s Yts	ss									YES			Yt S
0 x																								E S				
V (0										C 0 2	٨.																	
7 10														E	.			01H	Ŧ									
PART/SUB	HESPONDOH 201 202 203 204 205 206 207 208 209	\$ 204	205	206	207	208	209) 21(1 211	215	213	\$ 21,	4 219	5 216	21.5	210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 221 228 229 230	3 215	22.	0 22	555	22.	224	225	226	127	228	422	250
۷ 10																	YE S			YES								
01 8							YES	,_								YES	~				YES							
0 10	Yt S			YE 3	YES	YES YES YES YES	YES	i YE S	YES YES	YES	YES YES		YE	YES YES	S 11 S	·^		rt s	SYES			Yt s	Yt S	YES YES YES	YES		Yf S	× 1.
01 E	rt s	YŁ S	YES YES									YES	ın	YES	~												YES	Y 1. S
x 10	SIN SIN	'n																										
7 10																										2		

40E STIUN 102	102	MERE P TASKS FOR \$1	PRUCE IN I	PROCEDURES USED IN WHICH PROGRAMMENS OR ANALYSIS BID ON SPECIFIC IN THE DEVELOPMENT PROJECTS? (1.6. "1'LL WRITE THE EDIT PROGRAM 1.217.12")	VELU VELU	PMt N	MH1C PRC	H PR	ST C	4Mt HS	1. I.	ANAL L MK	111	u Io int. t	S NO	PR CLI	I I C						
			YES																				
		7 · C	UMMEN	-					,	;													
PART/SUB	HE SPONDUR 101 102 103 104 105 106 107	106 107		108 109 111 111 111 111 111 111 111 111 111	9			\$ 11	1 -	9116	1117	1 1 8	7	120	121	771	125.1	74 17	3, 5,	71 97	7 12	2 2	3
V 10																		Ξ	Yt S				
9 10	TES YES YES YES YES YES YES	YES YES		YES	t S 1	t S Y	3 7	s YŁ	S YE	s Yts	YES	YES	XES		Yes	TES YES YES YES	res	s		λĘ	YES YES YES YES	s xt	s
01 X														S					Σ	3 N S			
PART/SUB	KESPUNDUM 201 202 201 204 205 206 207	206 207		208 209 210 211 212 213 214 215 216 217 218 219 220 221 225 225 215 218 217 218 029	7 01	11 2	15 51	3 21	12 4	5 216	2117	218	219	077	122	7	5 5 2 5	24 2	8	\$0 55 \$0	1 62	χ 2	2
0 1 A			YE S	$\hat{I}_{,ullet}$																			
0 I B	YES YES	YES YES YES YES		YES Y		E 3 ≺I	S YE	s YŁ	S YE	3 YES	YES	YES	YE S	Y I S	YES	vt S	1 8 7	TES YES YES YES YES YES YES YES YES YES Y	S Y	S YE	s Yt	3 16	<u>ح</u> ج
,	2 2																						

UUL ST I UN 10 S	501	- 4 5 0 ア 2	A. VERY A. VERY B. MODE C. UNSU Y. NOT Z. USEF	IDDING AS DE VERY MODERATELY UNSUCCESSFUL NOT EMPLUYED USEFUL ONLY	ING AS DE RATELY OCCESSFUL EMPLOYED UL ONLY	NG AS DESCRIBED ABOVE WAS EMPLOYED, HOW SULCESSFUL MAS 117 PATELY ICEESSFUL EMPLOYED UL ONLY UNDER THE FULLUMING CONDITION(S)	CK18	ED A	BOVE F UL	MAS LUMI	r MP	LOYET), HC	ĭS 8(S)	ארנו א	SF UL	2 4 3	211			•					
PART/SUB	WESPUNDOR 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 125 124 125 126 127 128 129 150	106	101	108	109	011	Ξ	112	11.5	1.4	115	110	1.	118	511	120	171	122	12.5	24 1	25.1	26 1.	21 12	8 12	· 51	•
я •																				~	7 t S					
x 10																S.					I	S I M				
¥ 10	COI NON NON NON COI NON NON	100 NO	NCN	NCN		NUN COI NUN COI NUN NUN NUN COI NUN COI COI	N O N	C 0 1	NON	S	NO.	C 0 1	NON	C 0 1	100		100 100	103	NUN COI	10:		ž	NON NC	NUN EO1 CO1	9) 1	
PART/SUB	MESPUNDOR 201 202 203 204 205 206 207 208	305 51	207	802	209	210	211	213	213	214	215	216	21.7	218	519	220	177	777	, 523	2 4 5	209 210 211 212 224 225 227 227 227 227 227 228 219 219 217 218 217 218 217 218 218 219 250	ζρ ζ γ	27 26	25 B	\$	0
4 10				YES																						
* 10	MIS MIS																									
7 10	CO1 NON CO	NON CO1 CO1 CO1	C 0 1		NON	Z	C 0 1	C 0 1	N S	NON	NON	C 0 1	103	t 0 3	C 0 1	N O N	103	202	3 23	Z 70	NON COT COT NON NON NON COT COT COT COT NON COT NON NIN COT NON COT NIN NIN COT NIN	ž	Z	9 2	Ž	z

									_							
	1 50	Y1 5		YE S		X + S				250	Yt S	Y ES	Yf S	¥ S		
	57	78.5	YES							2	Y S	¥ + S	-	s t		
	 20	>	_	'n	က					20	.×		'n	S		
	71			Y & 5	YES					77	YES	YES	YES	¥		
	12.	Yt S	YES	YES	YES.					127	YES	YES	YŁ S	YES YES	YE S	
	<u> </u>	11 5	74.5	11 5	Y t S					97	* * * *		YES YES	Yt s		
	- .	_	715.	ສ	-					25.2	YESY	. S 1 A	YE: Y	YEST	23	
	-	n	z ×	YES YES	တ	s				2 7	×	7	z ×	z ×	CO4 YES	
	~	115	Yt S	¥	YES	¥ \$				25	Yt S		Y + S	Yt S	00	
냎	123	YE S	11.5	Y 1 S	X I S	Yt S				225	YES	YES	Y ts	TES YES		
¥ .	77	115		3	rt s	7 t S				25	Yt S	YE S	YES	S S	rt s	
<u> </u>	- - -	11.5	\$ 12	'n	Yt S	Yt S				2	_	YES	_	93	_	
z ¥	•	YES Y	YES Y	2	S	Ξ		r		· 7 0			ກ	YES YES		
¥ .	15	7.	7	*	YES			2		22		YES	71.3	7		
KE DUTKE ME RIT OF	5.			7.E.S	Yt S					518	Yt S	YES	Yt S	Y & S		
	118			rt s	YES					9 1 7		YES	1.5	rE 3		
A D D D D D D D D D D D D D D D D D D D	1.7			32	YES					17			YES YES	YES YES	S	
3.5	-	'n	တ	YES YES YES YES YES YES YES YES	Yts Y	s				9			⋝	_	COS YES	
200	=	Yt S	YES	7	*	Yt S	-			21					CO	
DEVELORMEL HEVIEWS WERE CONDUCTED AS A DEVELORMENT EFFORT. (AFR 300-15, 1978) AS HEAUTHERNIS HEVIEW AS DESIGN HEVIEW MINARY DESIGN REVIEW CAL DESIGN HEVIEW IL WINALTFICATIONS NEVIEW IL WINALTFICATIONS NEW EN	Ξ						N O N			212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 221 228 229 230		YES				
AS WHEE CO T. CAFE 3 FVIEW LEW GUNDUCTED	114		YI S	YE S	Yt S					717			YES	YES	YES	
E V IF V	1.5	Yt S	YES	S	YES.	YES				13	YES	YŁ S	YES, YES	YES YES		
UMING FURMAL HEVIEWS WER DEVELOPMENT EFFORT. (A EMS MEJULKENNIS KEVIEW FMS DESIGN MEVIEW IMINARY DESIGN KEVIEW ICAL DESIGN MEVIEW AL UNALIFICATIONS KEVIEW OMMAL REVIEWS WERE CUNDUR	2	YES	res	YES YES	YES	YES				21	YE 3 1	YES 1			9	
UMING FURMAL HEVIE DEVELOPMENT EFFOR EMS DESIGN HEVIEW IMINARY DESIGN REV ICAL DESIGN HEVIEW AL GUALIFICATIONS OFFMAL REVIEWS NERE	-	F	>			⋝				7	S Y		on.	S	S 7.	
HEN	=			YES YES	YES					71	YES	Y & S	YES	YES	Yt s	
UWING FURMEN DEVELOPMEN EMS WEJUINE FMS DESIGN HE IMINARY DESIG ICAL DESIGN PA AL UNALIFICAL OHMAL MEVIÈME	116			YES	Y £ 3					209 210 211	YES			Y 1: S		
ING S K I NA I	601		YES							209			S C 0 §	S C 0 S		
	8	YE S	Yt S	¥				<u> </u>			Yt s	YES	YE S	Yt S	YES	
_	1 20	>	-	>-			NON	3		7 7	>	YES Y	<u>ب</u>		8:	
2 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	<u> </u>	S)	'n	za.	s	n	ž			₹ 9	m	SYE	i.	YES YES	SYE	
	9	YES	Yts	YES YES	YE S	YES				02	YES	YES.	YE	YE	YES YES YES	
	105	2 4	YES	7 £ 3	YE 3					205	YE S	YES	YES	YES	YES	
	RESPONDOR 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 124 125 124 121 128 129 150	YES								201 202 203 204 205 206 207 208	TES TES	YES	TES YES YES YES YES YES	Yt S	YES	
	20	Yt S	41.8	Yt S	¥ + 8					03			£ S	YES		нта
	HE SPONDOR 101 102 1	-	Yts Y	S	YES Y				RE SPONDUR	~	ဘ	တ	S	YES Y	øĵ	2
	2040	so.	Z Z	YES YES	¥ .	'0			PUN	2	YE S	YE S	. YE	3 16	3 YES	
9 9	# C	YES	YES	YE	YES	Yt S			K	20			YES	YE S	YES	
40E ST 1 UN 1 04	80	_	_		_		_			90	_			_		
2	PART/SUB	٥ .	9 10) IO	9 10	0 E	٠ ١٥	7 10		PART/SUB	0 I A	£	0 C	0 10	0 1 6	7 10
3	d	-	-	-	•	•	•	_		Ā	•	•	•	•	-	•

- 7-7										
	1 \$0	100	900	100	200	100	001	200	Ξ	
	671	500	500	500	900	500	200	100	Ä	
	971	100	100	100	100	100	500	100		
	17	005 (003 (700	902	005 (900	500	E S	
	۲ م۶	005	0 700	0 700	003	0 700	0 700	005	Y X	
	45.1	0 100	0 700	0 1 00	0 900	0 100	0 500	0 100	> ¥	
	24 1	0 1 0	0 100	0 100	0 700	0 100	0 100	0 100	ıs u	
3	23 1	0 700	0 700	0 700	0 500	0 700	0 700	0 700	HIS ENS HIS UNK VAR L'SM PMK	
ş	22.1	0 1 0	0 1 00	001 0	0030		•	•	2	
	1 17	0 200	0 700	0 700	0 700	00 700	200	100		
3	20 1	0 100	0 100	0 100	0 500	0 100	9	•	S	
	2	0 700	0 700	0 700	0 500	00100	900	100	3	
₹	8	0 100		0 100	0 6 0 0	0 100	0 900	0 100	PAW MPU MPU MIS FSU	
	1 2	0 100	0 5 00	0 400	003 0	0 100	0 700	0 8 00	Ī	
>		00100	00 100	00100		00100	000 00	00 100	VPG P	
-	113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 150	•	ă	ŏ	001	9	•	6	S	=
Ž	7	4	4	9	4	3	٥	2	MIS MIS	100
ATTON OF ACF ACF ATTEND ST ATTEND AGE WST UL MST UL UF TIME OF TIME	3 11	900 1	900	900 1	1 000	1 004	900 9	1 003	ĭ	
NL HEVIEWS ION FHEDUENCY FORMAL DOCUMENTATION IDED IN ADVANCE OF HEVIEWS HEVIEWS THE HEVIEWS ALLY DOCUMENTED? THE HEVIEWS ALLY DOCUMENTED? AND FORMAL EWS THE FORMAL EWS (ADDED) LIATION OF THE CHAIRPER ALMAYS ALM	115 11	100 1	Ň	100 2	100 5	1 001	900 2	100 1	TAN PAN	
HENNING MEVIEWS ACTION/FREQUENCY LACIN MEVIEWS LACH MEVIEWS LODG MEVIEWS UN SCHEDULE? WHERE THE NEVIEW PROCEED FORWALLY DOCUMENTED? MANA THE FORMAL MEVIEWS? ATTEND THE FORMAL MEVIEWS? AFFILIATION OF FURMAL MEVIEWS? THEM WEVEN NO FURMAL REVIEWS? THEM WEVEN NO FURMAL REVIEWS? THEM WEVEN NO FURMAL REVIEWS? AMANAT OS = MOST OF THE TIME OS = MEVEN OS = SELDOM OS = NEVEN		1001	2 002	1 002	5 00 5	1 001	200 9	1 001		
LAFVIEWS UNTEREDUENCY UNMAL DUCUMENT UED IN ADVANCE RYTERS TAKE PL HEULIT? THE HEVIEWS ULY DUCUMENTED WAS TABLET WAS THE TILLY WAS THE TILLY WAS THE TILLY WAS THE TILLY ULY DUCUMENTED WAS THE TILLY WAS	0 111	1 00 1	2 002	2 001	2 005	1 00 1	900 9	100 1	UCU PMK ENS	
UNTREQUENT UNTREQUENT UNTREATE VIEW TAN VIEW TAN VIEW TO THE VIEW TO THE VIEW TO THE VIEW TO THE VIEW TO THE VIEW TO THE VIEW TO THE VIEW TO THE VIEW TO THE VIEW	104 110	4 001	1 002	\$ 005	4 005	4 001	900 9	1001	Z Z	
TANING MEVIEWS ACTIONS HE COLONE NO PROVIDED IN ADVANCE LACH REVIEWS DIO SKY VIEWS UN SCHEDULES THE PRO WHENE THE NEVIEWS DID TOP MANAGEMENT FORMALLY DUCUMENTE DID THE CUSTOMERNIE BAS AN INDEPENDENT REVIEWS AN INDEPENDENT REVIEWS AN INDEPENDENT MANAGEM TO PRO MANAGEM	0 - 2	2 004	000	1 003	5 004	4 004	900 9	100 7	Š	
	9	00	005	007	0	00	900	00	N/A +11	٥.
CONCERNA T. C.	107		4.			_			ž	C 0 2
	RESPUNDUR 101 102 103 104 105 106 107 10	002	200	005	003	000	006	001	VAR UCU PTO PMR MEN PMR	
	105	003	003	003	003			100	MER	
	104	900	900	900	000	900	900	900	3	
	10 S	001	003	700	900	100	900	100	PTS	
	RESPUNDUR 101 102 1	601	700	005	990	001	900	000	ngn	
Ş	KE SF 101	100	700	00	700	001	100	100	X X	
4ut S T T UN 1 0 5	# <u>5</u>	_	_		_				_	
	PAKT/SUB	V 10	a 10	01 C	0 10	01 6	0 F	9 10	=	0 1
3	Ą									

211 212 213 214 215 216 211 218 219 220 221 222 223 224 225 226 221 228 229 230	002 002 002 005	005 001 005 005	001 001 005 005	005 008 002 001	003 001 005 005	004 005 005	005 001 005 001	VAN PMN FMW MLP
7 977	5 0 0	700	700	200	700	700	001	I I
555	200	700	700 100	700	200 100 500	200	002	X X X
7 7	100	200	001	000	100	100	100	FMK FNS
663	700	200	700	300	00	500	005 005	1
454	001	700	100	000	200 100	700	700	11.711
177	90.	700	700	500	00	900	001	7
770	200 200	700	100	500 200	700	900	900 100 100 100 100	7
413	700	700	.00	700	200	900	00	3
218	700	700	700	700	100 100 100	900	00	1
717	001 008	700	700	700	001	400	001	3
210	100	700	700	700	001	000	100	3
212	200	100	00 000 700	700	001	<00	001	
412		700	700	700	100	000	100	
215	001	200	003 002	200	100 100 200	900	200	:
717	700	200	003	400	500	005	900	:
112	100	00 \$	100	200	100	900	100	i
210	200	700	700	907	200	700	005	
407	100	200	900	000	100	900	200	
208	001	001	100	001	00	00	00	
203	005	005	001	900	001 001	900	100	
205	00	005	00	605	900	900	100	
205	700	005 005 005 005	200	005 002 002	002 005	005 000 005 000	005 001 005 005 001 001	
204	003	200	005	005	005	200	200	
202	100	400	200	003	001	900	001	
201 202 205 204 205 206	100 700 800 100 100 700	004 005 004	100 200 200 005 005	100	100 100 100	005	200	
AE 34	700	000	900	002	100	003	001	
PANT/SUB	V 10	# 10		0 10	9		9 10	

	80		s		05		Ye S	
	. 62		YES YES		> 5 5	YE S	×	
	1 82	Yt S	-		72 80 23	Ξ	YES	
	27 12	I S			2 6		YES YI	
	42	3			97	n	Σ	
		2			? ??	ē Y		
	3.	S YE			7 7	=		
	25 25				7 F	HAC THO THO THD YES		
	77	15 Y			77 77	1 2		
		MAN THU YES YES YES YES CES			7 17	Ē	YES	
	50 1.	Ì		S I H	70 F	s	7.	
74 E D.	5		25	I	22 6))		
CUNFIGURATION MANAUFMENT SYSTEM EMPLOYED? TITLE/NAME	109 110 111 112 115 119 115 119 120 121 121 121 121 121 111 111 111 111		YES YES		209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 215 217 218 229 250	YES YES YES 483 THD SKD CCS		
I .	- 1	so 	Ξ		2 11	33 11		
SYS	9	S			17 91	S 41		
- -	15 1:	THO YES YES			5 51	:s		
NACE	4	=	YE S		7 7	S		
Z Z	15	S	Ξ		13 21	Z	YES	
<u> </u>	1 71	IND THD YES			2 2		YES Y	
16uk E/NA	=	₹ =			7 11	¥ 5 5	Ξ	
CUNF 1GURAT 11TLE /NAME	1 0 1	=	37		2 01	Ξ	Yt 8	
IWAKE GIVE	1 60		YES YES		₹ 60	YES	Ξ	
0F 1 %			con.		_			
WAS A SUF I A. YES B. NU Z. CUMMEN	07 1		res re:		5 10	YES 483 LIP CUS		
A 4	1 90	03	>		90	83 L		
	1 50	SUM CO3			5 50	ES		
	04 1	so	YES		0.4	-	YES	
	MESPUNDOM 101 102 103 104 105 106 107 108	E S	>		MESPUNDOR 201 202 203 204 205 206 207 206	YE.S	>	
	NDOK 02 1	0 S Y			NDOR 02 2	>		SIN
•	RESPUNDOR	YES COS YES			RESPUNDOR 201 202 20		Y £ 3	I
40E STION 106		-					>	
3110	PART/SUB	V 10	0 H	× 10	PART/SUB	4 10	20	x 10
2	PAR	•	•	•	7 *	•	•	•

UUE 31 10N 107	201	~ ~ ≺ c C t > ¬	SYSTE SYSTE PRELI CHILL DID N	******	BASE JINEM JGN K C DES SIGN SIGN SIGN	E SE	WAS BASE LINED AFTER (AFR 500-15 1978) REGUIREMENTS REVIEW DESIGN REVIEW NARY DESIGN REVIEW L DESIGN REVIEW HASE LINE SYSTEM (ADDED)	K (AF	200	<u> </u>	978)											
PAHT/SUB	NESPUNDUM 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 125 124 125 126 127 128 129 150	1 105 106	107 108	1001	1 01	=	5 115	114 1	15 11	1117	118	611	120	1 121	25 32	121-5	125	126	157 1.	21 83	-	~
0 I A			YES								YES		_	YES	Ĭ	YES YES	'0					
£		YES				YES	20															
01 C	YES YES														¥.	YES YES	(0		TES TES	S		
0 1 D	YES YES	YES					YES									¥ 8.	YES YES	Yt s	Ī	YES		
× 10												-	S I M	I	3 E							
-	NON		NON	NON	NDN C02 C03	0 3		NON C	02 C0	NUN COZ COZ NUN		NON								3 3	COI NON	=
PART/SUB	RESPUNDOM 201 202 203 204 205 206 207 208	1 205 206	207 208		2 01:	11 21	052 622 822 122 922 522 627 627 627 127 022 612 812 112 912 517 612 512 612 612 602	214 2	15 21	6 217	218	219	2.022	2 12	25 25	13 220	4 225	226 2		22 83	5	~
4 10						YES	ØB.					YES					YES	YES YES				
9 10	7£ 3										YES	YES YES		*	Yt S		1 t S					
) IO	16.5	YES YES	7 k S	YE S	>	YŁ S		>	YES	YES		YES		تر	YES							
0 1 0	YES	YES	YES										_	YES YES	ts vts	'n	¥1 S					
¥ 10 .	NON	,					NUN COZ	C 0 2				-	NON			C 0 2	21	2	NUN COI	=		
2 10	01н			•	о1н				H 10	I										6	01H 01H	_

UUESTION 108	3			2 -	ME HE	WENE FURN A. YES B. NO Z. COMME	HAL C	L S	GUKA	2 2	CUNI	TKOL	85 A K	MAL CONFIGURATION CONTROL BOARDS EMPLOYED? Ent	PLOY	£ 0.3											
PART/SUB	MESPUNDOR 101 102 103 104 105 106 107 108	13 10	105	106	701 4	7 106	104	110	=	112	113	114	115	109 110 111 112 113 114 115 116 117 118 119 120 121 125 124 125 126 127 128 129 130	17.1	18 11	9 12	71 0	123	123	124	125	126	127	128	169	1 50
V 10	YES YES YES	S								YE 3	YES YES			YES YES	9			YES	'n	Yt S	YES	X S	YES YES YES YES YES	YES	Yt S		
9 10		YE	YES YES YES YES YES	S YES	3 16.5	SYES		YES YES	Yt. S			YES YES	41.5		×	res ves	'n									YES YES	11.5
× 10																	SIN	: n	Σ S								
PARI/SUB	NESPUNDUR 201 202 203 204 205 206 207 208	3 20	4 205	\$ 206	201	7 208	_	210	211	212	213	214	215	209 210 211 212 213 214 215 216 217 218 219 220 221 222 224 225 226 221 218 219 259	17 2	18 21	9 22	177 0	1 222	22.5	224	225	226	127	424	224	2 \$ 0
01 A	YES YES	SO.	YES	YES YES	~	YES	YES		YES			yt s			¥	YES	YES	·A	7 5 5		YES	Yt S	YES YES			YES	
#	YES	YES	Ø		YES	æ		YES		C 0 1	Y & S		YES	YES YES YES	t S	7.t. S	ဟ	YES	~	YES				YES	YES COI		Yt S

GIVE TITLE, POSITION AND AFFILIATION OF CHAIMPERSON OF (SUFTWAKE)
CONFIGURATION CONTROL BOARD. (ADDED) **40ESTIUM 169**

MPD OCU MIS N/A N/A N/A N/A N/A N/A N/A N/A PHK N/A N/A UCU FSU N/A N/A MIS FMK MIS ENS PMK FMK FSU MPD PMK N/A N/A MESPUNDAR 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 PANT/SUB 100 10

HESPUNDUR 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 250 N/A MPD DEU N/A PSO MIS N/A MIS MEN N/A MPD R/A N/A PEN N/A N/A MEN N/A FSW N/A FMH N/A ENS PMH PMH N/A N/A PMK N/A PANT/SUB 100 10

UUE ST 10M 110

HOW OF IEN WENE INFORMAL REVIEWS CONDUCTED BETWEEN THE PROJECT MANAGER AND HIS SUPERVISOR?

A. DAILY
B. MEENLY
C. MONTHLY
C. AS REQUIRED
Y. THERE WENE NO INFORMAL NEVIEWS
Z. OTHER

PAH I /SUB	MESPUNDON 101 102 103 104 105 106 107 108	10 H 0	3 10,	01	2 .	01 0	7 10		=	-	=	-	3	=	5 11	051 421 421 421 421 421 421 521 121 121 130 141 111 111 111 111 111 111 111 111 11	7	_ _ _	71 6	0 12	1 15	7 15	7	471	126	127	128	129	1 50	
۷ : 0														7.6	YES YES	'n									YES					
H 10	YES		YES	YES YES	zo.	¥.	YES YES	S YES	ဟ				YES.	တ						YŁ	rts res	·n	YI S				YES	res ves	YES	
J 60										YES	ဟ						YES	ys.	YES	n			YES	YLS						
0 10	74.8	YES YES			YES	so.			YES	ø	YES	SYRS	S)			Y E 3	an.			YES	ø	x 1.	_	Yt s		Yt S				
¥ 10																		NON	2						,					
PANT/SUB	HESPONDOR 201 202 203 204 205 206 207 208	90 201	1 204	502	. 20°	9 20	1 206		9 21	0 21	1 21	2 21	3 41	4 21	5 21	209 210 211 212 213 214 215 216 217 218 219 220 221 222 224 225 226 221 228 229 250	7 210	\$ 216	9 22	22 0	777	555	1 224	577	226	227	228	622	2 50	
٥ . د					YE S	w)									YF S	s		YE S	con.							YES				
9 -	YES YES							YES	es.	YES	ø	YES	n			YES	s Yts	S YES	76	YES	70	Yt S	X	¥ 5			YES	YES YES	Y	155
0 10			YE S			¥	YES YES	s yts	SYFS	S YES	8 YES	y)	YES	S YES	ss				YES	:n	YES		YES		YES				7.5	
x 10		Z S																												
0 1 T				NON	_																									

QUESTION !!!	=				2 < 1	MACK-	THKO	COUGHS (AS CON KEVIERS	(AS)	T T	INE D	Z 7	t Ins	t Ki.	1761	WALKA-THROUGHS (AS DEFINED BY WEINBERG 1971) WEKE USED FORE A. DESIGN KEVIEWS	t US	it u f	i C C									
							1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	NOT USE	St #1	I K-1	MALK-THKUUGHS	снз																
PANT/SUB		MESPONDOR 101 102 103 104 105 106 107 108 109 110 111 112 115 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	104	105	106	101	1 0 6	501	0 -	Ξ	?	115	114	115	116	117 1	181	1 61	20 1	1.	21 22	3 12	ž 1 +	5 126	127	128	124	130
•	-	Y ES	YES	ı,n	YES		11.5			Yt 3	YES	YES		TES YES	YES				>	YES		YES	'n	YES	YES	YES		
3			¥ .	TES TES TES	YES		YE S				YES			YES YES	YES			<u>, </u>	YES YES	S.				Y ES	YES YES	Yt s		
	NON	NON	-			NON		NON	NO.				Ž ON		-	NON NON	N NO	NON		ž	200		NON	z			COI NON	S
7 10																					10	=						
PAH I / SUB	KESPUNDUR 201 202 20	MESPUNDUM 201 202 203 204 205 206 207 208	807	205	206	207	208	209	210	211	212	213	214	215	216 (217 2	18 2	19 28	50 S.	21 24	210 211 212 213 214 215 216 217 218 219 220 221 222 224 225 226 227 228 229 229	155 8	57 1	226	227	228	224	2 50
0 1 A	TES TES	r s	YES	YES YES			YES		YES							>	YES Y	Yt 8		ĭ	YES YES	တ	YES	φ.	YE S			Yt S
7 10	YES				YES			Y & S		YE S	YES						>	YE S		¥	YES YES	'n			YE S			Yt S
× 10		CNK																										
. 10						NON					_	NON	NON NON	NON	NON	NON		ž	NON NO	NON		NON	,	N C N		NON NON	NON	

STION 112 HOW OF IEN WERE WALK-IMMOUGHS	3
---	---

HOW UFILM WENE WALK-THROUGHS SCHEDULED?	DAILY	31 1 1 1 A	MONTHLY	AS RECUIRED	NOT USED	UTHER	
QUESTION 112	•			•	-	;	

PARI/SUB 101	۷ 10	0 E	0 10	NON A 10	RES PARI/SUB 201	01 A	9	J 10	01 U YES	× 10
MESPONDON 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 124 125 126 127 128 129 130			YES	NON	RESPUNDUR 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 227 228 229 250				YES YES	CNK
104			Yt S		204			YE 3		
105		YES			502				YES	
100	11 S				206				YES YES	
101				NON	207					
90			71.5		208				YES	
109				N C	504					
0	-			NON	012				YES	
=======================================	Yt s		_		2112				YES YES YES	
115			YES Y		5 21;				8 4	
131			rEs	Ž	13.2					
7			Z	NON	14.2					
11 51			YES YES		15 21					
11 9			ဘ	S	6 21					
7 11.				NON NON COL	7 210		7.			
9 11 9				N CO	B 219		YES YES			
)21 6			YES	_	9 22(on.			
171 0			YES YES		0 221					
124			/	NON	222	YES				
125			YES	-	. 223	S YES				
124			YES YES		524					
125				C 0 1	225				Yts	
126			¥ + S		556 ,					
1 771			TES YES TES		623				YES	
78 1			t s	ت	2 82		-			
5.				107 103	57 67		res ves		Yt S	
				=					S	

6 TH

	20,000																							
PAH1/SUH		201 202 20	201 202 203 204 205 206 207	¢02 1	700	207 2	08 20	208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 225 224 225 226 227 228 229 259	15 51	12.5	4 215	216	217	18 21	022 6	177	2 222	22 52	577 1	7977	27 22	422 8	2 50	
V 10	YES	16.8	Yt S	3 YES		Ξ	YES YES	s YES					~	YES YES	'n		YES Y	YES	Yt s	>	Yt S	4 5	YES	
20	YES YES	¥	YES	s ves			Yt S	ø									res						: =	
J 10	YES 1	rt s	14.8	s vt s		7	1 × ×	TES TES TES TES									11.5		¥ \$	>	YŁ S	3; ₹	YES YES	
0 10	_	74.5	YES	s Yt S		=	rts rts	ø					>	YES					YES	>	YES			
01 4			14.8	*		Ξ	YE S													>	Yt S			
1 10																				>	Yt s			
9 10	-	Y & 3	YES	3 YES		7	Yt S	YES YES											Yt s				Yt. S	
7 10																	Yt S							
× 10		Š	UNK																					
٠ ١٥					NON COI	103		3	COI NO	Š	NON NUN NON COI COI	100	103		NON	Z		C 0 1		NON	S	z		

160

PART/SUB		NESPUNDON 101 102 103 104 105 106 107 108 109 110 111 112 115 114 115 116 117 118 119 120 121 125 125 126 127 128 129 150
03 A	<	YES YES
0 5 15		
0 3 C		Yts
0 5 0		
9 F 6		715
9 8 0	9 4	214
0.5 1		YES
x 10		SIM
0 3 Y	S Y NUN NON NON NON NON NON NON NON NON COZ NON	IN NON COZ NON NON COI COI NON COI NON NON COI COI COI
PAH 1/SUB	HESPUNDOK 201 202 203 204 205 206 207 208 209 210 211	215 214 215 216 217 218 219 220 221 222 223 224 250 215 215 216 217 218 219 250
0 5 A	4	53),
0 3 15		x t s
03 C		S #A
0 \$ 0		SIA
9 50		\$ 11.
03 X		
7 20	Y COI NUN	NON NON NON COI NUN NON COI NUN NON NON NON COI COI COI COI NUN NON COI COI NON NON COI NON COI NON COI

6N C0DINE UTITER B 119 120 121 122 123 124 125 126 127 128 YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES	UESTION 114	114			¥	1 M 4	1. X-	MERE WALK-THROUGH MINDIES/HECORDS KEPT?	Z z	NUTE	STHE	COMO	3 KEF	21.													•	
/30b					A	YES NU MAL UTH		KOUG)	S NG	₹ 5 1	a				á	es FSIGN		0 Z N E	3 5	* # * * * * * * * * * * * * * * * * * *								
< 3 × > 00 < 3 × >	N178UB		3 104 1	05 1	1 90	07 1	0 9 1	10	0	=	11 2	114	115	9	117	2	5	120	121	3	3	1 n	3	:			3	9
H NON NON NON NON NON NON NON NON NON NO			YES Y	ESY	ES	>	Ł S		YE								•		:	:	1 2	- - -	, ,	0	· ;	-	~	~ ~
Y NUN NUN NUN NUN NON NON NON NON NON NON		YES.								YE:) YES	3 71 5	YES						4		2	2	2	n	``	_		
T NON NON NON NON NON NON NON NON NON NESPUNDOR 201 202 203 204 205 206 207 208 A YES																			2					*	-			
MESPUNDOR 78UB 201 202 203 204 205 206 207 208 A YES YES YES B YES X UNK MIS Y			-		ž	N _C	2	an No	z							100	100	S C N	-	203		ž	Z			٠	9	107 107
A YES YES YES YES B YES K UNK MIS Y	HI/SUB	HESPUNDOR 201 202 203	2 604 2	05 2()e 26	17 20	2 80	09 21	0 211	213	215	214	215	216	217	810	5	5		2	2	2	:					
H YES	٥١ ٧	76.8	YES	E S		Ξ	'n	ES CO	s YES				·			3 3 4		2	7	4 3	Ç 3	7	Š O :	4	228	Ň	₹.	5
Y COI NUN NUN NUN COI COI NUN NUN NUN NUN NUN NUN NUN NUN NUN NU		yks								YES							y U		-	2	2	Ï	n			≍	Š	71 S 71 S
NÛN NÊN NON COI COI		CNK		Ī	S											•	2					•		YES				
	<u>-</u>				ŝ	-					NON	NCN	NON	100	103		Z	Š	Š		Ū	ž	Š	•	NO.			

											10.	ر								
1 50				(0)	230	YES				1 50	•			C 0 1		250	rt s			
129					627		YE S			129				r 0 1		082 622				103
128				NON COI	228				N C N	8 Z I				Z O		828				NO.
121		Yt S			155	YES			_	121				z		123				
750	YES				987				Š	7 97				Z		92				S
55				Z	\$				Z Z					z		? ??				Z N
54.1				Z Z Z	24 2				NON NON NON	24 1				NUN NUN NUN NUN EO1 CO1		2 42				z
7 5 7	¥			Z	5 5 6		Yt S		z	23 1	Yes			Z		2 2				2 10
77	>			NIN	7 77	Yt s	>			75	_			z		2 22) In
1 17		rt s		Z	۶۱۶	>			ž	= =				ž		7 17				Ū N
20 1		YES Y			7 0 Y				NON NON	0.7				ŭ		7 02 50 7				ž
2		₹		100	219 220 251 222 223 229 255 250 257		eg.		ž	3				J I		122 055 655 855 857 577 127 055 815				COI NUN NUN COI COI NUN NUN NUN COI NUN COI
051 621 821 121 971 521 531 531 531 171 116 114 119 119 119 150 150 151 151 150				D 100	218 2		rts rts			114 115 116 117 118 114 120 121 122 123 124 125 126 127 128 129 130				NON COI COI NON COI NON		17 8		တ))
1 1				NUN	2112		Ξ		=	7 11				2		7 218		YES		_
•			2	ž	216 21				100 11	=			ဟ	Z		6 217				1 C0
		'n	MIS						NUN NUN NUN CO1	5 11			N S	z		5 216				NON NON NUN COI COI
7		YES YES			215 214 215				ž	=		'n		NON		4 215				S N
		3 18			17 5				N O	2 11		YES		z		3 214				Ž
7 11		5 11 5			12.2		s		Š	2 113				NON NON		2 213		so.		Ž
=	'n	¥ 5			1 212		YES		z	211 111 011 601				Ž	.	1 212		YES		7
=	YE S			z	0 211	~			NON	=				-	0	210 211				NON COI NUN
104 110				N N N	209 210	YES CO3				Ξ				NON NON		510				00 -
_		'n		Z C Z		_								ÖN		506				
RESPONDIN 101 102 103 104 105 106 107 106		YES		7	204 205 206 207 208	YES				HESPUNDUR 101 102 101 104 105 106 107 108		YES		_		KE SPUNDUK 201 202 203 204 205 206 207 208				C01 C01
01				NON NON NON	500				C 0 1	101				NUN NUN NUN		207				00
70				Š	707			MIS	_	106				NC		206			M	
50	_			ğ	502				NON	105				S		502				NON NON
10	YES			_	204	YE S				104	YES					204				NON
10.0				NON	HE SPONDOH 201 202 203			UNK		103				NON		Ú# 203			S	
RESPONDEN 101 102 1		YE 8			HE SPONDOH 201 202 2				NON	KESPUNDUR 101 102 1			S W			KE SPONDOR 201 202 2				CO1 NON
RES 101				NON	HE S 201		YES			NE S.				S		Kt 3				003
SUB	4	£	×	>	SUB	<	23	×	-	SUB	•	20	×	>	7	SUB	⋖	22	×	_
PAHT/SUB	7	70	70	₹0	PART/SUB	70	70	20	70	PART/SUB	03	0.5	. 50	0.5	50	PAH1/SUB	03	30	6	0 5 7
1					a.					ž						3				

IF IT MERE WITHIN YOUR PUMER TO MAKE ANY CHANGES IN THE METHOD OR PROCEDURES FOLLOWED IN CONTROLLING THIS PRUJECT WHAT WOULD THESE CHANGES BE, OK, IF YOU HAD RESUMEES AVAILABLE TO UNDERTAKE RESEARCH IN THE AREA OF PLANNING WHICH ASPECT WOULD YOU EXPLORE?	NESPONDOK 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 150	E CHB CIF MIS CWC CVB MIS MIS MIS MIS PBE MIS CIF PIA PIA N/A CMB MIS MIS MIS NUN XKF MIS MIS CIB CIB	CVB U60 PBH CVC	9W7	5 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 250	S MIS CMH MIS MIS CII PRH MIS CWC MIS CME D4D CWC CVA MIS MIS CIK CHE CSG CMD MIS CNB MIS CIC CHF CMG	PSI CMF CSJ N10 CKC
11- 17 NEWE WITHIN YOUN PHUCEDURES FULLUMED IN CHANGES BE, OK, IT YOU RESEARCH IN THE AREA U	105 106 107 108 109 110 111	MIS MIS X7H MIS CTE CHB C1F MIS CWC CVB MIS	CVB U60		RESPUNDUR 201 202 203 204 205 206 207 208 209 210 211	MIS MIS MIS NON MIS MIS CMB MIS MIS CII PRB	P51
UUL STIUN 115	NE SPONDOK PANT/SUB 101 102 103 104	OI OOI MIS MIS XTH MIS	01 002 CMC	01 00 \$	HESPUNDUR PANT/SUB 201 202 203 204	OI OOI MIS MIS MIS NON	01 005

UINECIIY										
DESCRIBED)			CER'S URGN	Z			CFR'S CRGN			
ENIER THE NUMBER OF POSITIONS (BY CATEGORY DESCRIBED) DIRECTLY	NVOLVED IN THIS DEVELOPMENT PROJECT	A. FULL TIME, REPORT TO PROJECT MANAGER	FULL TIME, REPURT UNTSIDE PROJECT MANAGER'S URGN	FULL TIME, UUTSIDE CONTRACTUR/CONSULTANT	TIME, CUSTOMER	IIME, REPURT TO PROJECT MANAGER	TIME, REPORT DUISIDE PROJECT MANAGER'S URGN	PART TIME, UNISIDE CONTRACTUR/CONSULTANT	PART TIME, CUSTUMER	
NUMBE	I Z	I I Mt	Į,	I IME.	Ĭ.	IIME,	I IME,	I mt.	IIM.	
EK JHE	01 16	FULL	FULL	FULL	FULL	PART	FART	PARI	PAKT	
E N	2	۲.	£	ن	-	.	•	ئ	Ī	
110N 116										

								165		
1 50	400	000	000		700	100	000			230
129	100									229
128									N I	228
121					008	00				227
126					Y& S					226
125	0.0		004							225
124	040	210								224
125	800	120	0.55			700	900			223
771	008	0 6 5								222
121									S.	221
120	600	035	710	000	000	000				220
119	900									219
118	700									218
1117	0 7 0									217
110									N IS	216
115									MIS	215
7	908									214
113	655	030	250							213
112	100									212
Ξ	910									211
0 1 1									3 2	210
109	017	090	020							209
108	012 015 002 004 020 01		002 001 050	900 015						208
107	400	050 005	005	200		00 900		001		207
106	005	070				900				206
105	015									205
104	012	900	000	000	000	000				204
NESPUNDOR 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	_	_							S I	HESPONDOR 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230
HESPUNDON 101 102 1	040 034	000	000	000	000	000				HESPONDOR 201 202 20
	940									HES 201
SUB	<	£	J	0		•	9	I	×	SUB
PART/SUB	0 1 A	6	5	6	01 E	•	5	0	•	PART/SUB
-										2

3 '	HESPONDUR 201 202 205 2	2 40	2 50:	06 20	HESPONDUR 201 202 201 204 205 206 207 208		209 210 211 212 213 214 215 216 217 218 219 220 221 222 224 225 226 227 228 229 230	11 21	2 21	3 21	4 21	5 216	217	218	219	220	5 122	2 22	2 5 2	24 2	25 26	56 23	7 22	8 229	230
	•	010 650	0 1	9	900 900	100 8	ŏ	700	010	900 0	10 9	010 050	012		910	900	002 001		0 10	001 030 015		015 030	\$00 0	5 045	010
		•	8 0 0	000	ۅ		700	70				003			001						70	500 570	5 003	*	0 7 0
					900	_	00	10											•	100 500	01 004	4	900	9	700
							00	10			005	<u>^</u>	900			700								010	615
							700	7							100	J	200				800	E		605	
							00	=																	
•	MIS MIS		I	SIN		2	CNK	N I S	တ					Š											

~
-
Š
=======================================
3
3

	_	
	129	YES
	128	Yt. S
	127	Yt. S
	126	YE S
	521	F.S
	124	11.5
	52	res .
	221	11.5
	151	YES
8	50	1.8
10 July 10 Jul	*	rs 1
L L L L L L L L L L L L L L L L L L L	81	1.8.1
CUSI	-	t. S. Y
11 PE	9	_
LE CES	115	rt s
SIBLE SUNNE SUURC SUURC SHANG	*	IES 1
PRUJECT MANAGER WAS RESPONSIBLE FUR TECHNICAL GUALLITY HIRE AND FIRE ASSIGNED PERSONNEL (WITHIN FIRM PULLCY) EVALUATE PERFURMANCE UF INDIVIDUAL PERSONNEL ADMINISTRATION, HUDGET, FIG. ALLOCATING COMPUTER RESOURCES ALLOCATING COMPUTER RESOURCES METING SCHEDULE COMMITMENTS NEGOTIATING SCHEDULE COMMITMENTS NEGOTIATING SPECIFICATION CHANGES MITH CUSTOMER MARING A PHUFIT (1.E., OPEMATING WITHIN A HUDGET) NONE OF THE ABOVE (ADDED)	107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129	YES YES YES YES YES YES YES YES
S HE	112	rt.S.)
MANO MANO MANO MUTE COMP	=======================================	1.8.1
PRUJECT MANAGER WAS RESPONTECHNICAL GUALITY HIRE AND FIRE ASSIGNED PER EVALUATE PERFORMANCE UF IN ADMINISTRATION, HUDGET, FI ALLUCATING COMPUTER RESOURE HEFTING SCHEDULE COMMITMEN NEGOTIATING SPECIFICATION MANING A PHUPIT (1.E., OPE NOME OF THE ABOVE (ADDED) OTHER	9	1.8
A TAKETER A TAKET A TA	601	16.8
PHUJEC HIRE AN HIRE AN HIRE AN AN AND AND AND AND AND AND AND AND AND A	801	res
	101	res
-<2007F2I->-	901	
	501	(ES)
	RESPUNDOK 101 102 103 104 105 106	YES YES YES YES YES
	- × 0	resi
	16 SPUNDOK 101 102 10	resi
~	ESPI 01	ES
711	~ -	>

PART/SUB		RESPUNDOK 101 102 1	0k 103	1 0 4	RESPUNDOR 101 102 103 104 105 106 107 108	901	101	108	109	110	111	112	113	7	115	1 0 1	110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129	- 2	2	20 1	21 15	- A	21 53	1 12	5 12	51 9	7 12	12.	1 50	
۷ 10	YES	YE S	YE S	YES	YES YES YES YES YES	YES	YES YES YES	YES	YES	Y I S	YES	YE S	YES	YES	Yt S	_	YES Y	YES Y	YES YES		YES YES YES	S		YES YES	s YES	S YES	s Yts	SYES	i YES	
9 10	YES	YES YES	YE S		YES								YES					>	YES	>	Yt S		7	Yt s	Y t. S	တ		YES		
01 C	YES	YES	YE S		YES		YES	YES YES	YE S	YE S	Yt S	YŁ S	YE S	YES	r ES	_	YES	>	YES	>	Yt s	Z	YES YE	YES YES	s Yts	zń.		Yt s	S 1 1 S	
9 10	YES	YŁ S	YES	YES YES	YES	YES	Yt S	YES YES	YES		YE S	YES	YES			-	YES		>	YES	*	YES Y	YES YE	YES	Yts	s yts	s yts	SYES	••	
0 F	YES		YE S	YES YES YES		YES		YE S	Yt S	Yt. S	YES		rt s			_	YES Y	YES Y	YES Y	YES Y	YES YES	5. *	YES YE	YES YES	SYES	s Yt S	Srts	s Yts	,,	
01 F	YES	YES YES	YES	YES	YES YES YES	YES	YES YES	YES	YE S				YES			_	Yt S	F	YES Y	Yt S	¥	YES YE	YES YE	YES YES	SYES	SYES	s Yts	s Yt S		
9 10	YES	YES YES	YES	YES	YES YES YES	YES	YES YES	YES	YE S	YŁ S	YES	YES	YES	YES	Y t 3	_	YES	F	YES Y	YES Y	YES YES	S	YES YE	YES YES	SYES	s YES	S YES	3 YES	. Yt s	16
H 10	YES	YES YES	YES	YES	YES YES YES YES YES YES	YES	rt s	YES	YE S		YES YES	YES	YES	YES	YES			<u>, </u>	YES Y	Yt S	*	YES Y	YES YE	YES YES YES	3 7	s YES	s Yts	s Yts	. Yt 5	
1 10		YES	YE S			Yt S	YES		YES									×	YES Y	YE S	7	YES YE	YES YES	ø			rt s	s Yts	71.5	
x 10															_	N I S														
7 10			014																											

PAR	PART/SUB		201 202 20	203	202 203 204 205 206 207 208	407	206	707	408	402	210	117	212	213	213 214	215	210	211 218	218	417	219 220 221 222 225 224 225 226 227	177	777	577	177	577	977	177	426	622	2 30
•	۷ 10	11.8	ø		Yt 3	YES	YES YES YES YES	YES.	YES	y E.S.	x t	YES	YES	YES		X I S	TES YES YES	Yt S	YES	Yt S	71.5	YES		rt s	Yt s	× 1 ×	¥ :	YES.	YES	Yt S	Y S
•	a 10	YES	ø		YE S				Yt S	¥ + 5		Yt 8						YES			*	X 5		Yt S	Yt s	X IX		Yt s	rt s	YI S	
•	J 10	YES	Ø	YE S	YES YES YES	YES		rt s	TES TES	YE S	Yt S	YES	¥ + s	YES	¥1.	YES YES	44.8	Yt S		YFS	YES YES	¥ 5	YE S	YES YES	YES	¥ 8		Yt S	YES	Yt.s	Yt s
•	0 10	YE S	ø	YES	YES	YES	YES YES YES YES YES	YES	YES	YES	YE S	Yt S					YŁ S	YES	YES		Yt S		Yt s	YES	YES	Yt S		Yt S	Yes	Yts	
•	01 t	YES.	တ		YES	YES	YES YES YES YES	YE S	168	YES		7+ 55				YES	Yt S	YES		X + S	YES		¥ 1 5	YES	YES			X + S	YE S	71.5	
•	9 I 6	YES	ဟ		rt s	YES	YES YES	Yt s	YES	YES		YŁ S				YES	YES			YE S	Yt S		14 5	YES	YŁ S			YŁ S	Yt S		
•	9 10	Yt 3	on.	YES	YES	YES	YES YES YES		YES YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	X F S	Y & S	Yt S	rt S	Yt S	71.5	YE 9	71.5	rt S	YES.
5	I	16.5	s	YE S		YES	YES YES YES	¥ \$ 1	Yt S	YE S	YES	YES		YES	YES	Yts		7 t S	7 t S		Yt s		YE S	YŁ S	X + S	Y 1 5	¥ 8	YES	14.5		71.5
•	1 10	Yt S	s	rt s	YE S			YES	YES YES	YES	YŁ S	YES				YFS	YES	YE S										YES	Yt 5	X 1 S	
•	×		H I S																												

THE TITLE AND PUSITION OF THE PROJECT MANAGER'S SUPERVISOR MAS	
Ħ	-
AND PUSITION OF	
THE TITLE	

UUF 3T 10N 118

:	20	9
:	5	3
	97	5
;	- />	9.0
•	7	S
•	Ç	¥ .
;	-	3
•	<u>-</u>	÷
	2	ž s
•	-	ī
	-	ĭ
	71 6	ī
•	=	Ĭ
	-	¥ .
	=	A I
	-	H
:		H C
:		ĭ
:	=	4
:	051 671 971 771 971 571 671 571 771 171 171 611 711 911 711 611 511 711 711 711 711 711 711 711 711	Z Z
:	=	¥C.
:	-	ĭ
•	-	ĭ
	2	MCP MFA MEN MCP PEN VPE MEN MPD MIS MPD MFD MEN MIS MEN MIS MFD HCP MEN MIS MCP MPD VPG MPD
•	2	H Y
	9	E E
4	2	MEN
	5	HCP
3	2	Z Z
ESPONDOR	70	M F N
RESP	701 001 001 701 701 701	I GOI MPD MEN MEN MCP MEN MEN MPA
3	5	-
70137		10
3		

AKSPONDUR 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 250 OI OOI MCP MIS MPD VPG MEN MCP MEN PMW MPD VPG MEN MEN PEN PEN PEN MCP MGH FEN MEN MCP PMH MGH FEN FLS FSA MPA MEN MPD MCP PART/SUB

THE SPAN OF CONTROL OF THE PROJECT MANAGER'S SUPERVISOR CINCLUDING	+++++ HOUNS.
THE PROJECT	
CONTRUL OF	THE PHUJECT MANAGER) MASH++++++
SPAN UF	PRUJECT
Ĭ#1	752
UULSTIUN 119	

1 50	000
129	30
128	900
127	170
126	000
521	677
124	250
123	010
122	010
121	900
120	N I S
?	100
=	990
1117	001
9:	SIE
115	090
114	Z S
113	556
112	000
=======================================	140
108 109 110 111 112 113 114 115 116 117 11H 11Y 120 121 125 125 124 125 126 127 128 129 150	0 040 020 140 004 999 MIS 060 MIS 100 006 007 MIS 006 UIO 010 250 025 004 021 006 100 060
109	040
108	4
107	000
100	007
501	040
104	00
OH · 103	000
1 SPUNDOR 01 102-10	400
HE S	900
RESPUNDON PARI/SUB 101 102·103 104 105 106 107	01 001 000 000 000 000 000 000 100 10
PARI,	6

406.81	WUESTION 120	0.7				I A	INE TITE	7	E, POST	E. POSITION.	, , ,	Ğ	MET	AND NUMBER OF PEOPLE REPORTING DIRECTLY TO THE	Pt (1P1	*	FOR	3 N E	DIME	כ נו ג	=	Ė							
						₹ \$		-	u		95 PUSI 1 10N	NO.			03 NUMBÉ R	35 BE R													
							PROJE		- NA NANU	ECI MANAGER'S SP /unrnuwn (Added)	KODE C	A C	1 10	ECT MANAGER'S SPAN OF CUNTRIL IS /unanuwn (Added)	¥ = = = = = = = = = = = = = = = = = = =		ž !	PERSONS											
PANT/SUB	'SUB	NESPUNDOR 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127	103	104	105	901	101	80	109	110	111	112.1	113	1 7 1	15 11	16 11	1 1	8	9 12	21 0	2	2 123	124	125	126		128 12V 150	7	1 50
5	•	FSE FTE PTD CAN LPA ENS LPA CAN LPA ENJ LSE	P10 1	CAN	LPA	ENS	l A 4	CAN	r b a	ENJ		ECH ESW	S	أند	E AN	3	S1 A	COV LSA PLS	'n	7 A	•	7 A		CMD	UMA ESW LSW	ES.		PMK CPA	EP.A
5	2	FSA FLS	FLS FLS CPR SMG EHM CPA CAN	34	SMG	HH	V V d	NV	_	ENG F	ENG FHW CDV	J MH	7 0:	-	L AN	ئ	CPA CP	CPR ENG	ون	FLS	'n	SEC		CMA	FIE	LSM		PMA	CPA
0	J	11	••	SEC	SEC SEC ESW	ESW	•	CPA	_	181	ENJC	CAN CUP	90			څ	CMS EN	ENG CPR	~	SEC	ں			C M	UMA CAN CPH	CPR	••	SAS	
5	٥			31.1	CPH		-	CAN			3r I	J	CDV			F S.N	3									31.5			
10	ı.							S.P.R								SAU	<u>a</u>									CAN			
5	×												•	M IS	Ī	SIM			MIS	ø	MIS		N N				SIX		
PAR1/SUB		HESPONDUH 201 202 203 204 205 206 207 208	JH 203 ;	5 04 .	205	7 902	207	208	209	210 211	2112	212 213		214 215 216 217 218	15 21	15 91	7 21	8 219	9 220	2.5	221 222	223	424	522	922	455 254 255 256 257 258 259	228		7 08.7
0	<	1 S P	•	017	CPA	_	ENG	ESM	FSK	PMA	FSYC	CAN CPA		CPJ FTC	70 OI	CAN FSY	Y FSA	A LSE	ند	I W M	1 118	SEC	CPA	FLS	FLS CPR	FAP	FAP PMA		CPR
6	2	PHC	•) I I C			-	t NG	F SA	_	FAP		J	CPK C	CPR CP	CPH FSW	W ENT	I SPC	ں		LFA	CFR				FAN	FSA	FSD	CAN
6	J	FLS					_	CAN	FSA	_	F V 3			t SW	=	E16 FIM	M t NS	S			M	\$15				CDA	FEN	F St.	LFA
6	9	LPA					_	ENT	F Su	-	FPC		-	t Sh	Š	SUP 1. SA	⋖				S.L.	SLI PMK					FSS F0S	SO	
-	ı.							t 16					ı	Ł SW				_											
=	.							SEC																					
6	×	N I S	S I																										
5	-				•	100													00										

PAR1/SUB	NESPUNDUK 101 102 103 104 105 106 107	10 110 111 601 HOI	2 115 114	115 116 11	1 611 911 /	-	20 121 12	1 521 721 121 02	51 971 571 671 571 771 171 07	081 621 621 621 621 621 621 521 521 121 021 611 110 111 111 111 111 111 111 111 11
02 A	S	CHP.	813	× 4 -					CPA	CPA
# ~0	514	CAN	11.5	E AN					SAD	SAD
02 C	+LS	C 7 2	514						818	מ מ
0 70		CAN	118							
02 E		MAC								
x 70			NIS	SIE	Ī	<u>s</u>	Ī	N S IN	MIS MIS	
02 Y	103 103 103 103 103	CO1 CO1 CO1	-	(O)	103 103 103	103		100		CO1 NUN CO1 CO1
PANT/SUB	KESPUNDUR 201 202 203 204 205 206 207	208 209 210 211 21	2 213 214	215 216 215	7 218 219 24	20 221 2	24	22 223 25	22 972 S22 B27 828 728	208 209 210 211 212 224 255 255 255 255 256 214 215 215 215 215 215 215 215 216 217 208 208
0.2 4		FLS FLS			11.8				FA	FAP
0 Z B		FLS FLS			F1.S			¥		- E AN
J 20		FLS FLS			11.3			I		WM1 CDA
0 20		FLS FLS						H	111	111
02 t		FLS								
02 F		SEC								
02 x	MIS MIS									
170	C01 C01 C01 C01	NUN CO1 CO	1 001 001	NUN CO1 CO1 CO1 CO1 CO1 CO1		CO1 CO1 CO1 CO1	-		.01 C01 C01 NUN	

PART/SUB	NF SI	NE SPONDON 101 102 1	NESPONDUM 101 102 103 104 105 106 107	104	105	106	101	108	501	110	Ξ	112	S 1	114	115	111 112 113 114 115 116 117 118 119 120 121 123 124 125 126 127 128 129	1 11	81	21 61	21 0	1 12	2 1 43	124	125	126	171	128		1 50
4 5 0	001	001	100	001 001 002 002 001	900	400	000	003	200	700	000	100	070	-	200	ŏ	0 100	00100	700	000	_	800	20	100	200	001		900	004
0 3 H	200	001	001 004	100	001 055	022	00 \$	100		900	001	100	0 \$5	-	200	ō	0 100	00 700	200	900	•	700		100	100	200		700	005
0 § C	100			100	100 100 100	003		001		700	100	100	050			5	00 100	200 200	~	001	_			100	100	00		004	
0 8 0				100	915			000			100	-	010			ŏ	100									0.0			
03 £								100								ŏ	100									001			
9 8 0	004	005	004 002 002 012 020 030	012	070	030	004	050	111	012	\$10	003	1 560	SIN	000 M	O SIM	0 500	00500	006 MIS	S 006	S M S	S 012	N M S	004	9 0	900	\$ 00	710	9 5
PAHT/SUB	NE SF 201	HE SPUNDOH 201 202 2	HESPUNDUH 201 202 203 204 205 206 207	204	205	206	707	208	209	210	211 2115	212	213	214 6	215 2	216 217	17 21	218 21	6 22	455 527 277 172 027 61 2	1 22	777 2	1 224		526	125 978 578	052 422 922	424	250
0 3 A	100			100	010		929	100	900	001	100	010	010	001	0 5 0 0	000 00	0 100	015 06	004	008	\$ 00 \$	300 \$	000 000	003	615	001	100		
9 20	001			007				001	110		100		-	001	0 900	00 700	0 100	015 001	=		008	N 003				700	100		
03 C	900							001	010		001			100	0	004 00	0 100	010			003	3 00 5	_			200	100		
0 8 0	010							100	900		001		-	100	•	003 001	Ξ				9	041 001					100		
0.5 t								100					•	200															
03 F								001																					
03 6	770	R I S	024 MIS 010 008 010 020 025	000	010	070	959	900	035	005 350	350	010	010 000 011	900	0 110	050 000 070	14 0!	510 00	5 01	010 004 055	4 05		015 020	012	015	0.55	550	050	100
¥ 40						C 0 1																							

QUE ST 10N 121	121				INDICATE THE	Alk	· · · ·	HE VIEWS	E C	PRI	uJk C1	REVIEWS THE PRUJECT MANAGER ATTENDED AND THE CAPACITY Trended	CER	A 1 1 F N	DED 1	I ON	¥	APAC 1	_							
				-)				ž	O1 REVIEWER	z	×	02 HF V 1 E ME E		0.5 OBSERV	~ >						
				110124		PUMMAL (MANAGI WALK-THKOUGHS) BUDGET MEVTEM TECHNICAL MEV THENE WENE NO	HERE TEAL	FURHAL (MANACEMENT) HEVIE WALK-THROUGHS BUDGET HEVIEWS (AUDED) TECHNICAL HEVIEWS (AUDED) DIHERE WERE NO KEVIEWS (AU	(AUD)	MF VI	FURMAL (MANAGEMENT) HEVIENS (MALK-IMKOUGHS MUDGET REVIEWS (AUDED) TECHNICAL REVIEWS (AUDED) THERE WERE NO REVIEWS (AUDED) UTHERE	FORMAL (MANAGEMENI) HEVIENS (ADDED) WALK-THROUGHS BUDGET REVIEWS (ADDED) TECHNICAL REVIEWS (ADDED) THERE WERE NO REVIEWS (ADDED) OTHER	3													
PAH1/30B	MESPONDOR 101 102 103 104 105 106 107 108 109	103 L	01 10	» 10¢	101	9	5 0	9 -	=	1 21	11 51	4 115	116	11.7	9	61	70 7	71 17	21 2	124	\$71	126	121	1 971	051 621 821 721 921 521 521 521 721 121 021 611 811 711 911 541 511 811 811 111 011	2
•	74.9	-	YES YES	s YES	TES TES	YES			YES	¥	YES			YES	YES	YES	F	YES YES COZ YES YES	0) s	z YES	YES.		YES	YESY	YES	
Ð			YES	S YES					YE S			Yt S										Yt s	YES YES	Yts		
J	YES	>	YES	YES		YES			>-	YES YES	SS.			Y & 5	YES YES YES	11.5	×	YES YES	'n	YES				YES YES	8	
×											HIS.	'n	S I W			Σ	s I w									
>	C01 C01	101					C 0 1	C 0 1													C 0 1				100	_
PAR 1/8UB	HE SFONDOH 201 202 203 204 205 206 207 208 209	# 203 2	04 20	5 206	207	208	209	210 211	2112	12 21	13 21	4 215	216	217	218	2 612	20 2	7	2 22	\$ 224	572	770	, 155	228 4	082 622 922 L22 927 522 622 522 222 122 022 612 912 L12 912 512 812 612	3
•	C 0 2	Y & S	YES	'n		YES			>	ES Y	YES YES YES	SYES		Yt S	Yt S				7	YES YES		Yt 5		YESY	YES YES	173
35			YES	s		44.8	TES TES																		Y1.5	
01 C	YES						YE S	YES				YES			Yt S			Yt.S	ر. در	YE S		¥ + 3		Yt. S		
0																				200						
×	3 3							-	SIE																	
>		Ç	100	C 0 1	(0) (0)								Š		•	0 100	100 100 100	10			107		C 0 1			

1 50			yes yes			230			YŁS			
124	YES		Yt s			422			YES YES			
128					100	877	Yt S		Yt S			
121					103 103	122	Yt s		YE S			
971	Yt S		Yt S			226	Yt s		YES			
521						572	¥1. S		11.5			
54					100	. 42			YES YES	700		
2.5	C 0 2				•	5 528			YES			
1991	J				N	5 225	x					
121					COI NON	122	× 1 ×					
021				SIW	_	620						100
110 111 112 111 114 115 116 117 118 119 120 121 125 124 125 126 127 128 129 150					100	208 209 216 215 215 215 215 216 219 220 225 125 216 217 218 215 215 215 217 218 219 230	YES					
118					100 100	218						100
1117	Yt S		Y E S			217			YE S			
=				SIE		216	YES					
115	Yt S	Yf S	Y & 5			215						C 0 1
114				S S		214	Yt S					
115					C 0 1	213						103
112	YES					212						(0)
111			YES			112					S I H	
110	¥ &		YES YES			210	¥		Y E 3		•	
104	res ves		YES YES			502						NON TO
108 109	rt s		YES			208						C 0 1
101					ZON	207	TES TES		YES			
106			YES YES			90×	YES		Yt S			
NESPONDUM 101 102 103 104 105 106 107	Yts		YES			HESPONDUR 201 202 203 204 205 206 207			YES YES YES YES			
104					NON	204	YES	Yt S	YES			
103	YES		YES YES YES			UK 203						C 0 1
NE SPONDUM 101 102 1			YE S			HESPONDOK 201 202 20					Z Z	
101			YES			HE 36	C 0 2	YES	YES			
SUB	~	£	J	×	>	SUB	~	2	J	٥	×	>
PART/SUB	05	0 A H	J 70	x 70	٧ / 70	PAH1/3UB	0 Z	70	70	95	0.2	0.2

PANI/SUB 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 124 125 126 127 128 129 130	0 S A	0 S B	0 8 C	0 5 x	0 3 Y	PAR1/SUB	0 S A	0 5 B	0 3 C	0 10	× 50	03 Y
10. 10.					100			YES		C 0 2		
101 102 10	YES	71.5				RESPUNDUR 201 202 203 204 205 206 207 208		(A		۸.	s I	
103) 103	5 0 S	YE S					J
104					CO1 CO1 CO1	5 #0;						100 100
1 501	>				10:	2 50		>				
1 90	YES				Z	2 90		YES				ټ
07 1		>-			NON	5 10		YE				100
80		Yt S			C	2 80		25				ū
70) I O	. v v o		Z				103
101					01 C	10 21		Yt s			Ī	
-)) In	17 11					S I R	00
11 21					COI COI COI COI COI	12 21						0.0 1.0
11 5				I S	=	3 21						1 C0
1	71.5			ဘ		4 21						1 00
5 116	'n			SIE		5 214						CO1 CO1 CO1 CO1 NON CO1
				٠	00	. 217						100 1
118					CO1 CO1 CO1	218		Y ES				
61.					00	219		YES	YES			
120				Σ.	•	220	x 1 x					
171		165				221						100 100
125					SON	777						C 0 1
123	Y 8 3 1	YES				082 622 922 123 972 522 523 525 525 125 025 612 912 112 912 512 513 513 513 115 015 602		YES				J
1 64 1	YES				J	5 428						C01 C01
1 571					N 10)	\$ 57	>					10:
707					NON COI	799	Yt 5.1	X				
27 17	¥	Ħ			10	27 62		YES				Ĵ
Z8 12	Yt 5 Yt	7 & 5	ž			58 25						CO1 CO1 CO1
51 6	TES TES		YES			5 5 5						07 1
9	S					9						

PROJECT MANAGER WAS EXPECT A TECHNICAL SUPERVISOR A NUN-TECHNICAL SUPERVISOR PROJECT ADMINISTRATOR (ONL NONE UP THE ABOVE (ADDED)	111 011 5	YES YES YES YES YES YES				9 210 211 21	YES CO3 YE			Z I S
S EXPL 1508 258418 108 (0	115 11	't S YL		YES		2 21	.s.		7,	
PHOJECT MANAGER WAS EXPECTED (BY CORPURATE MGM1) TO BE (ADDED) A TECHNICAL SUPERVISOR A NON-TECHNICAL SUPERVISOR PHOJECT ADMINISTRATOR (ONLY) (ADDED) NONE UP THE ABOVE (ADDED)	15 114 115 116 117 118 11	S YES YES YES YES	YES	YES YES	S I W	15 214 215 216 217 218 21	YES VES YES YES YES YES YES YES YES YES	¥+\$	YES YES YES	
TO BE (ADDED)	189 119 111 112 115 114 115 116 117 118 119 120 121 122 124 125 126 127 128 129 130	S YES YES YES YES YES YES YES YES	YES YES YES YES	S YES YES YES YES YES YES	MIS	209 210 211 212 214 215 214 217 218 219 220 221 225 224 225 224 227 228 229 230	S YES YES YES YES YES YES YES YES		YES COLYES YES YES	
	130	SYES	YES	s yt s		9 2 50	zo.		YES	

	YES YE		Y		1.6	YES	SIM	COI NON NON		४२ ४२८ ४२४ ८२४ ८४५ ४४	71.5	YES.	YES YES	rts rts rts	YES			103 107
121 122 123 124	YES YES		¥ 1 ×	Yts	X		2		#10	per ees ees tee	YES		Yt S			TES TES	SI	
6 117 118 119 120	YES YES	YES			YES		ø	CO1 NUN		6 217 218 219 220	YES YES					YES YES		1 001
115 114 115 11	YFS COI		YES			¥ + 8	¥			15 213 214 215 216			Yt S					100 100 100 100
8 109 110 111	YES YES					Yt s	N S	103		7 208 209 210 211	YES YES	YES	YES YES	YES			S X	J
13 104 105 106 16	YES YES YE		YES			ø				3 204 205 206 20	YES YES				YES			100
HESPUNDOH Part/Sub 101 102 10	A YES	zi	a	w		YES							U YES	ند			MIS UN	
	HESPUNDOR 101 102 103 104 105 106 167 10	HESPUNDOM 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES YES YES YES YES YES YES YES YES THE	HESPUNDOM 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES YES YES YES YES YES YES YES YES YES	HESPONDOM 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 VÉS YES YES YES YES YES YES YES YES YES YE	HESPUNDON 101 102 103 104 105 106 167 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES	#ESPUNDOM 101 102 103 104 105 105 105 109 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES	HESPUNDON 101 102 103 104 105 106 167 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES YES YES YES YES YES YES YE	HESPONDOH YES	HESPUNDOR TES T	NESPONDOH	HESPUNDOM 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 YES YES YES YES YES YES YES YE	102 103 104 105 106 107 108 109 110 111 112 113 114 115 115 115 115 121 121 121 121 124 125 126 127 128 129	1-2 102 103 104 105 106 107 108 109 110 111 113 114 115 115 115 125 125 124 125 126 127 127	Figure F	154 154	15 15 15 15 15 15 15 15	15 10 10 10 10 10 10 10	Figs 104 105 104 105 106 107 108 109 110 111 112 113 110 110 110 110 120 123 124 125 125 124 125

	XESPUNDOR	501 901	106 10	7 108	60	110	=======================================	7 11 5	114	115 1	1 91	11 /1	9 114	120	171	1771	23 124	125	77	- />	21 02	7 .	
	Fat 301 101			27. • *	55 → >		,	res yes	YES YES			YE	YES YES				S 17		_	YES YES	S)	11.5	
∀ ~0	153	163 163	_				>	S 4 × S 4 ×		7.6.5									-	res res	9		
02 H								. 4		× ×							7 t 5					× = = = = = = = = = = = = = = = = = = =	
0 Z D		7 t. S						_	•	2	2	ت د د					71.5		\$ 1,	>-	YES	× 1 ×	
9 Z F											-	2								>	7	S 4 X	
9 60	YES YES			¥ .	TES TES		-	11.5			>	Yt S								•			
,						H I S				•	SIM				<i>27</i>						N IS	ဘ	
¥ 20							,							103		NON COL	-						
V 70			נפו נפו	<u> </u>			- 3																
•	KESPONDOR	200 000	76 406		8 209	210	2112	12 21	5 214	215	2 912	17 21	18 21	9 220	122	285	25 22	552 #	977	2 127	28 82	008 209 210 211 215 216 217 218 219 250 251 252 255 250 250 215 215 215 215 217 218 219 209 209	
PARIZOB							,	9			-	YES		YES			YES YE	YES YES		YES YES	ts YES	'n	
02 A	YES	YES YES YES	s ves		2 2 2		-	2												5 1 4	>	5. 4.X	
0 Z B					YES																	,	
02 0																		\$ =		YES	2		
																				_	YE S		
02 F											YES					YES	YES YES YES YES	SYES	YES	YES YES	res Tes	n	
02 F		YES	υ													3					7	¥1.5	
02 6	YES																						
N 70	HIS UNK	¥	I	N I S			N I S								n I							,	
29				C03	-	103		ິລ	201 601 601	103		Ų	CO1 CO1	=								- - - -	_

UUE ST 1 UN 124

USING MANAGEMENT BY UBJECTIVES THE OBJECTIVES WERE:
SET BY THE PROJECT MANAGEM WITHOUT INPUT FROM THE LEAM MEMBER
SET BY THE PROJECT MANAGEM WITH INPUT FROM THE TEAM MEMBER
PERIODICALLY REVIEWED
DID NOT USE MANAGEMENT BY OBJECTIVES
COMMENT

MESPUNDUM PART/SUB 101 102 103 104 105 106 107
7£ S
YES YES YES YES YES YES
YES YES YES
SII
NON NON
MESPUNDOK 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 223 224 225 226 227 228 229 250
YES YES YES YES YES YES YES
YES
MIS UNK MIS

Yt S 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 125 127 128 129 130 YES YES YES YES YES YES YES YES TES TES TES YES 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 YES YES YES YES YES YES YES YES YES TES YES YES YES YES YES YES YES YES YIS YES X L S YES YES YES YES YES YES ¥ t S YES X t S YES YES YES YES YES Yt S YES Yts Yt S YES YES Yt S YES Yt S Tt S YES **YES** ¥ 3 YES YES S I Yt S YE S Yt s YES YES YES YES YES Yt S YES Yt s YES YES YES YES YES YES Yt 8 YES YE S Yes X t s YES YES YES YES YES YES YES **Y**Ł 3 YES YE S 11.8 YES YES YES YES YES YES MIS UNK **KESPONDOR** RESPONDOR YES YES YES YES YES Yt S YES YES PART/SUB FAR1/SUB 0 I B 010 010 0 F = = 9 0 0 0 01 F . . 4 10) [9 10 ٥ ١ ٥ 01 × ٥ ا 01 E = = × 10

40ESTION 125

F . E

ISSUED INSTRUCTIONS TO HIS SUBUNDINATES IN WRITING DELEGATED TECHNICAL DECISIONS TO HIS DIRECT SUBORDINATES (TEAM):

HAD AN OPEN DOOK POLICY CHIEFS)

EMPLUYED UUALITY STANDAKUS DEFINING WHAI WAS EXPECTED DE FACH Programmenjanalysi . i

•

EMPLOYED DUANTITY STANDARDS DEFINING HOW MUCH; EACH PROGRAMMER/

MONITORED PRUCKESS WITH THE AID OF A CONTROL BOARD AND/OR CONTROL ANALYST SHUULD ACCUMPLISH •

HAD A SEPARATE OFFICE TO INSURE PRIVACY HAD A PERSONAL SECRETARY ٠. ت د

UUE ST 1 UN 127	IF YOU HAD IT MITHIN YOUR POMER TO IMPLEMENT CHANGES IN THE WAY THIS
	PROJECT WAS DIRECTED, OR HAD THE RESOURCES TO DEVOTE TO RESEARCH IN
	THIS AREA, WHAT ACTION WOULD YOU TAKE?

1 50	85A	
129	S S	
128	S W	
121	2 2	
126	SC	
125	SIN	
124	S I	
123	<u>ه</u>	
162	STE	
121	S	
120	S I E	
511	SIE	
118	318	
08 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129	MIS MIS MIS MIS MIS MIS MIS MIS DRE SIG MIS MIS MIS MIS MIS MIS MUN MIS MIS MIS SSA	
116	S I	
115	<u>s</u>	
7	S.	
115	<u>s</u>	
711	S H	
==	Z N	
110	2	
109	N N	
108	MIS	
101	010	050
106	S I	
105	PSE	
10	S I	
3H 103	018	DIC
AESPONDON 101 102 103 104 105 106 107	HIS MIS DIE MIS PSE MIS UID	
Rt S	H N	
AHT/SUB	100 10	700 10
AHT.	5	10
_		

HESPUNDUK PANT/SUB 201 202 203 204 205 206 207 206 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 221 229 230 OF BOT MIS MIS MIS MIS MIS MIS MIS MIS MON NON MIS DIA MIS MIS DSA USD MIS MIS MIS MIS USD PKC MIS PSA MIS USD MIS MIS MIS USH USF 01 005

92
-
ž
_
u£ S
_

						TED BY CUSTOMER	LE (AUDED)	
2	SOX COMPLETE OR LESS	SIX TO 75% CUMPLETE	OX COMPLETE	BX CUMPLETE	99% 10 99.49% CUMPLETE	100% COMPLETE AND ACCEPTED BY CUSTOMER	CANCELLED/MOT DELIVERABLE (ADDED)	
THIS PROJECT IS	SOX CUMPL	S1 X TO 75	761 10 90	5 OL X16	99 11 99	100% COM	CANCELLE	CUMMENT
I	Ψ.	Ð.	ن	<u>.</u>	•	-	-	7

PAN1/SUB	RESPONDUR 1 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	NDUR 02 10	3 10	01	5 106	10	101 /	8 105	110	111	112	113	114	115	911	111	118	119	120	171	122	123	1 24 1	1 57	126 1	1 22 1	1 821	621	1 50
01 6			YES	ø							Yt. S	YES																	
) 10								Yt S	,,,	71.5																-	YES		
0 10		Y & S	ຶ	YE	res res res	s YE	on)															•	Yt s		_	Yt S			
01 F																				YI 51									
9 1 6	YES YES	E S							YES				YES	¥ t s	TES YES YES YES YES COL	YE S	YES	YES	C 0 1		res res	YES	_	YES YES	r s		_	YES YES	YES
, I 0							C 0 4	•																					
PAKT/3UB	KESPUNDOH 201 202 203 204 205 206 207 208 209 210 211 212 215 214 215 216 21/ 218 219 220 221 222 225 224 225 226 227 228	NDUH 02 20	3 20	7 70	> 206	202 4	7 201	205	210	211	212	215	214	215	918	112	218	219	220	177	275	228	224 2	5 25.	126 4	27.5	3 828	, 455	
A 10	ĭ	res	YES	29			YES	an.								,													183
J 10																							_	YES YES!	rt S 8				
0 10		Yt S	s										16.5	res ves			.*		res										
01 E						YES	ø											YES		YES									
01 5				YE	YES YES	~		YES	YES YES			YES			YES	YES YES YES	YES				X F S	YES YES YES	rt S		_	YES YES YES YES	1 5)	S 11	rt s

MIS MIS

703

× ×

_
29
_
_
20
_

autstiun 129	621		* 4 3 3 3 × 7	o.	14E PROJE VES. UN S YES.++++ NU YES. HUME PROJECT N	DALCO N SCI NO NO N	Ht DUL Ht DUL Ht DUL H + + H H + + H H + + H H + + H H	THE PHOJECT COMPLETED ON ON BEFORE SCHEDULE? YES, ON SCHEDULE YES, THE THE THE THE THE TEALLY NO, THE	D UN LAIL CATI	UK B ONS A	E FUK	# SCH	F DUCE A F A A C	E Z ADDEĐ AJLAB		(ADDF U)	2								
PART/SUB	RESPONDUR 101 102 103 104 105 106 107 108 109	104 105	106	107	108		1 0 1	110 111 112 114 115 116 117 118 119 120 121 122 124 125 126 127 128 129 130	11 2	3 114	1115	116	111	118 1	2	21 02	1 150	125	124	125	126 1	21 15	21 B2	9 130	_
4 10	YES YES	YES YES YES	YES					7	YES YES	S	YES.	YES YES		YES YES	S)		YES		YES			*	YES YES	n	
13 10	8/8			900	006 008 003	_	012 006	90		910			900		õ	001 011	~	990		00 670	0 400	100		00	
01 C2	030			040	040 032 010	_	100 030	30		100	_		050		ā	100 000	1	045		001	100 010 001	51	·	900	
0 10	C 0 2																								
¥ 10					C 0 2																				
7 10											014														
PART/SUB	KESPONDUP 201 202 203 204 205 206 207 208 209	204 205	206	207	208		210 211	11 21	2 21	3 214	. 215	216	052 422 827 127 922 522 822 822 822 827 122 022 618 818 818 918 518 818 818 818	2 913	19 2,	20 22	1 222	223	224	225	2 972	27 22	28 22	4 256	_
4 10		TES YES YES YES YES YES	YES	res	YES	YES		×.	YES COU YES YES YES YES	4 YES	YES	YES	YES				Yt s								1
01 C1	900 900					-	003							0 900	0 90	006 008 008	~	010	003	700	0 900	010 003 004 006 002 002 001 003	00 70	1 00	84
01 62	\$10 110					•	010						Ū	0 520	25 0	025 025 012 030	•	045	100	025	0 010	045 007 025 010 008 011 005 018	00 1	5 018	_

S I W

uut s 1 1 Ú	GUESTIUN 130 IF NOT COMPLETED ON TIME WHAT WAS THE MAJUR CAUSE UP	MAJUK CAUSE UF SLIPPAGE
	A. CHANGE IN METHOD OF DESIGN H. CHANGE IN METHOD OF DESIGN C. HAD INITIAL ESTIMATE D. UNKEASONABLE ESTIMATE, BY EITHEN TOP MANAGEMENT ON THE CUSTOMEN E. LIMITED AUTHORITY OVER RESOURCES F. EXCESSIVE ABBINCES ON THE PART OF THE PROJECT TEAM MEMBERS G. POOR MANAGEMENT (ADDED) Y. PROJECT WAS COMPLETED OR IS ON SCHEDULE (ADDED) Z. OTHER	OP MANAGEMENT OK THE CUSTOMER THE PROJECT TEAM MEMBERS IEDULE (ADDED)
PART/SUE	RESPONDUR Part/Sub 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115	113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130
V 10		YES YES YES YES YES YES
9 10		71.8
J 10		YES YES YES
9 10		YES YES YES COS
9 10		503
01 6		
9 10		703 803
01 Y	Y C01 C01 C01 C01	C01 C01 C01 C01 C01 C01
7 10		пп
PARI/SUE	RESPUNDOR Pari/sub 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217	052 622 972 127 922 527 622 522 522 527 122 672 612 912 112 912
V 10		YES YES YES YES YES YES YES YES
01 6		242
0 I C		YES YES CO3
0 10		YES YES YES
01 E		YES YES YES COS YES YES
9 10		₹03 203
x 10		
¥ 10		CO1 CO1
7 10		H10

OUE STION 132	IF PROJECT WAS LATE, WHAT PURITUR (IN PERCENT) IS ATTRIBUTABLE
	TO CHARLE US DESIGNATIONS OF PERFECTIVE

NESPONDUK PANT/SUB 101 102 103 104 105 106 107 01 001 N/A N/A MIS MIS N/A N/A 000

60t 9410N 135	ABILITY TO MEET THE SCHEDULE? (UNIGINALLY NAKHATIVE) A. HESTRICT THE NUMBER OF CHANGES B. REQUIRE FORMAL SYSTEM OF CHANGES C. REQUIRE A FIRM NEUDIREMENTS BASELINE D. CONDUCT MUNE HEVIEWS E. NECELVE MUNE AVIEWS E. NECELVE MUNE AVIEWS E. NECELVE MUNE ASTREM OF SCHEDULF G. PERFORM HETTER PLANNING H. NOTHING 1. HETTER DIRECTION AND CONTRUL J. BETTER AND EARLIER REQUIREMENT SPECIFICATIONS Y. PROJECT WAS COMPLETED OF IS ON SCHEDULE Z. OTHER
PAKT/SUB	MESPUNDOW 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 12
۷ - 0	707
9 10	C05
J 10	. C05 C05
0 10	707
9 10	C 0 2
1 10	C 12 XFS
9 10	C02
H 6	C02

28 129 150

187

707

101 (01

107

190

C01 C01 C01 C01

100

S

103 103 103

C01 C01

- 7 - 10 S E

C 0 7

700

203

PANT/SUB	HESPONDUK 201 202 203 204 205 206 207 208	203 20	205	3 206	207	208	507	012	, 1115	15 21	15 21	4 21	5 216	117	2 812	19 22	127 (777	28 22	082 627 828 128 928 528 628 628 628 628 128 028 618 818 218 918 518 618 618 618 608	125 0	22 922	4 250
۷ ۱ 0	€03											C 0 2	₹u		Z03							YES C02	24
# 10												200	31										
3 10	C 0 2	C 0 2	2																C 0 2				200
01 E							2 03												005			yt S	
9 10	200	C 0 2																					
01 6		C 0 2					£ 0.5			ü	C03				u	203	503	J	703 70J				
H 10	٠							C 0 2															
01 E	C 0 2																		0)	CO2 CO2 CO3	203 Z		
01 5	C 0 2														C 0 2			U	203			203	34
01 X									HIS	SIN	N/N	<				n E	-0						
01 Y			100	CO1 CO1 CO1 NUN	0.03	NON							C01 C01	0.01				100					
7 10	C 0 2																						

AD-A117 998	SACRAMENTO RESULTS OF DEC 79 R H SM-ALC/MME-	THAYER,	SOFTWARE DE J H LEHMAN	MCCLELL VELOPMEN	AN AFB	CA SERV	ETC GEMENT	F/G 22 INE	/2 TC (U)	
3 10 5										

_	_
3	•
•	٩
•	
2	ľ
c	3
-	-
ď	1
	ú

WAS THE PROJECT DELIVERED WITHIN THE UNIGINAL HUDGE 1?	A. YES, ON CUST	B. YES. S+++++++++UNDFR CDSI.+++++++ UNDER CDSI	C. NO. B++++++++++++++++++++++++++++++++++++	D. YES, HOWEVER SPECIFICATIONS MEME REDUCED (ADDED)	Y. PROJECT NUT COMPLETED AND/UM NO ESTIMATE AVAILABLE (ADDED)	ZURIO 7
ST10N 154						

110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	YES YES			504 163 N/S 103	0 010 015 065	215 214 215 216 217 218 219 220 22 222 223 224 235 226 227 218 219 215 219		S YES 154 YES N/S YES	3 YES 006 YES 007 YES 8		
71 15		\$0\$	ر د	20	170	55.		154 YES	O YES		
23 12		\$	N/S	405	220	23 22		N/S 15	010 960		
1 27				N/S 4	0 110	25.5	rt s	Z	à		
1 171				N/8	0 9 0	21.2	>			SIN	
120				8/8	010	5 022		S/N	010	-	
611	Yt S					219		504	910		
118	rt s					218		YES	YES		
1117				505	900	211		154	100		
116	YES					216	YES				
511.				1 233	900	215	YES				
3 114		:0	<u> </u>	707	020	\$ 214	YES	•			
2		N/S	010	s	~	2.5	20	YE S	YES		
= =				4 N/S	0 015	1 212	YES			ø	
= 0				N/S 204	090 050	210 211		စ္	0	H	
50	ø.			ž	Ö			N/S N/S	010 570		
1 80	X.			80	E S	80		ž	ð		
RESPONDOR 101 102 103 104 105 106 107 108 109				N/S YES	070 YES	KESPONDOR 201 202 203 204 205 206 207 208 209	YES				
901	YES				•	506	YES				
105	YES YES YES					205	YES YES YES				
104	YES					204	YES				
0A 103				N/S YES	100 YES	DR 203		N/S	910		
RESPONDOR 101 102 1				8/8	100	KESPONDOR 201 202 21					
	YES					KES.					
PART/SUB	٠ •	18 10	01 82	10 10	23 10	PAR1/SUB	۷ 10	13 10	23 10	v 10	

HIS SLIPPAGE (CAMPLEAN HIND ACTION LINE)
11 THE MANAGER OR THE FROJECT TEAM TO COST (ADDED) S 116 117 116 119 S CO1 CO1 CO1 CO2 CO2 CO2 CO3 YES YES YES YES YES YES YES YE

DUESTION 136

UUE ST I ON 137	137	# 4 4 # 0 0 % 7 3 E H 4 >	KEST IN KEST I		COULD HE BUDGE IN SYSTEM REGULA MERCALLA SYSTEM REGULA MERCALLA STIMAT LA STIMAT RESTIMAT RESTIMAT RESTIMAT RESTIMAT RESTIMAT RESTIMAT RESTIMAT RESTIMATE TEE OMPLETE TEE	THING, COULD THE FRUCKAM MANAGET THE BUDGET? CORTGINALLY THE NUMBER OF CHANGES FORMAL SYSTEM OF CHANGES FORMAL SYSTEM OF CHANGES MORE REJUIREMENTS HASELINE MORE REJUIREMENTS WER PROJECT ETTER ESTIMATE OF COSTS BETTER ESTIMATE OF COSTS BETTER FLANNING TRECTION AND CONTROL ND FARLIEM HEUDIREMENT SPECT WAS COMPLETED OF IS WITHIN C	TO MEET THE GUUGETT CONFIGNALLY NAKRATIVE) KRICT THE NUMBER OF CHANGES JINE FORMAL SYSTEM OF CHANGES JINE FORMAL SYSTEM OF CHANGES JINE A FIRM REQUIREMENTS HASELINE JOUCT MORE REVIEWS A BETTER ESTIMATE OF CUSTS OWM BETTER ESTIMATE OF CUSTS OWM BETTER PLANNING ING ING ING ING ING ING IN	K HAVE DU	2	T T T T T T T T T T T T T T T T T T T	S T T					
PART/3UB	HE SPONDON 101 102 10	Z. DIMEK Nespondom 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 150	01HE	K 109 110	211 111	113 114	115 116 1	17 116 11	9 120	1 171	121 23	124 1	25 126	1 121	28 129	150
V 10	ວັ	C02										ິງ	203			
9	3	C 0 2														
01 C			203	C 0 5	C02 C02											
01 E							ŭ	C02								
9 10			€03				Ü	C 0 2			C 0 2			C 0 2		
9 10			C 0 2	C 0 2	C02 C02					·						
H										ŭ	203					203
01 1							Ú	C 0 2								
f 10			C 0 2		C02											
x (0	S I		I	ø	S I M		MIS MIS		N I S	MIS MIS			S I W			
۸ ۱۵	100	CO1 CO1 CO1		100		100	0.01	CO1 CO1	=			C 0 1		•	CO1 CO1	
7 10														C 0 2		

192

PART/SUB	KES 201	PONU 202	RESPONDEN 201 202 205 204 205 206 207	204	205	206	201	20 S	204	210	115	717	215	714	215	206 209 210 211 212 215 214 215 216 217 218 219 220 25 25 255 254 255 215 215 215 216 209	217 ,	, 812	5 615	2 0 2	212	77 77	5 22	4 225	566	227	228	624	950
4 10	C 0 2																								C 0.5			260	
01 C	C 0 2															C 0 2							707	2.	203			•	707
0 10																						707	ž						
01 E																-	C 0 2	_	C 0 2				C 0 2	21		C02 C02	7 N J		
01 F	203		C 0 2	_					C 0 2																				
9											C 0 5							_	C 0 2								C 0 2		
I 0										C 0 2																			
1 10																							C03	21			703		
r 10													C 0 2			C 0 2		YES							70 3		•	70J	
x 10																			x	HIS MIS	2			H IS					
01 Y		NON	_	103	CO1 CO1 CO1 CO1 NON	C01	C 0 1	NON				00		00	100 100						Ĵ	107							
7 10	C 0 2																												

OUESTION 138	- NO	136				¬	DID THE SPECIFI	فت	k L IV	I HE I	Cus l	I MAN	¥ = °	1.1	Ĭ	: an 3	IKEME	s z	DELIVERED SUFIWARF MELT THE REGULREMENTS AS UNIGINALLY D HY THE CUSTOMER?	4161	NALL	>				٠				
								NO NO MEDUIMEMENIS SPECIFIED CAND/OM PROJECT NUT COMPLETEU) (ADDED) OTHER	30.5	ř.	S E	PECI	r tet	3	10 / Q1	7	17F C1	NC.	СОМ	PLET	(a 1	(Abb	3							
PART/SUB	SUB	MESPUNDOR 101 102 103 104 105 106 107 108	400R 02 10.	3 104	501 1	100	101 4	108		-	Ξ	711	Ξ	-	Ξ	=	=	=	109 110 111 112 121 221 221 121 121 121 121	071	121	122	123	124	125	126	1 /21	78 1	- 52	30
-	~	YES YES	ø)	Yt S	3 YES	YES YES YES	are.		YES	*	YES	res	YES	1 YE 5	, YL :	00 (YES	¥ £ 8	YES 1" 4 YES YES YES YES TES COS YES YES YES YES	YŁ S		y£ S	YES YES YES	Yt S		Yt. 3	rts v	YES YES YES YES	ts ≺	S 1
-	I		YE S	2																	YES				YES					
0	>						NO.	NON NON	_																					
PART/SUB		MESPUNDUM 201 202 203 204 205 206 207 308	100K	5 204	502	506	. 207	308		210	211	313	213	21.5	215	216	217	218	209 210 211 212 224 225 226 227 228 229 220 221 222 223 224 225 214 215 214 229 239	220	221	222	223	224	225	977	27 6	7 87	2 52	9
V 10	•			YES	YES	YES	YES YES YES YES		YES		≺E S	YES YES YES	YES	YES	7 £ 5	YES	YES	YES	VES YES YES YES YES YES YES YES YES YES Y	YES	YES	Yt s	YES	YE S		YES YES		YES YES	Š	
ā	3 9		YES																	•					YŁ S				Ę	Yt. S
ž	_	SIN	Ø																											
0 T	_	200						NO.		NON	_																			

		MESPUNDOR 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130	YES YES			209 219 215 215 225 225 225 225 225 125 025 915 815 715 915 215 915 215 215 115 015 805	YES	Yt S	
		128	YES			328	YES		
		127	YES YES YES			227		Yt. S	
		126	YES			226	YES		
		125		Yt.S		225		Yt S	
		124	YES			224	Yt S		
1	G	123	TES YES YES			223	YES		
a :	AUDE	271	11.5			272	YES YES YES YES		
# C F	<u> </u>	121		Yf S		177	YES		
IS ST	1.51	120		YES YES		220		YF 8	
CUSTOMEN ACCEPT THE DELIVENED SYSTEM AS MEETING SPECIFIED NEWS IN TOTAL, OR DID HE TOENTIFY EXCEPTIONS? PIED SYSTEM IN TOTAL AS MEETING SPECIFIED REQUIREMENTS THEFT DESCRIPTIONS.	NO KEQUINEMENTS SPECIFIED (AND/OR PROJECT NUT COMPLETED) (AUDED) OTHER	-	YES			419	YES		
15 ME 15 P T T U 15 D	NOT	2	TES TES			218	YES		
EXCE	15.51	117		YES		21.7	YES		
SYSI IIFY IGSP	780	16	¥ \$			216	Y & S		
DID THE CUSTOMEN ACCEPT THE DELIVENED SYSTEM AS MEETING REQUIMEMENTS IN TOTAL, OR DID HE TOENTIFY EXCEPTIONS? A. ACCEPTED SYSTEM IN TOTAL AS MEETING SPECIFIED NEGLIAR AS TOENTIFIED PERFORMS.	7.CR	115	YES YES YES YES YES YES			215	YES YES YES YES YES YES		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1) AND	7	YES			214	S H &		
14 DE DAD	110	113	YES			215		YES	
# 10 TO 1	101	=	YES			212	RO Ind Ind		
VCCEP VTAL	2	=	YES			211		YES	
N TC	Z	9		YES		210	Yt S		
1510F	3	109	YE S			209	YES YES		
	HE KE	108			C 0 1	208			N C
ME OUTHE	. ž 5	101			NON CO	207	YE 9		
2 2 4 4	>~	90	CO3 YES			206	YES		
		105	C 0 3			205	VES YES YES		
		104			Z	204	YE S		
		36 105		YE.S		RESPONDON 201 202 203 204 205 206 207 208		11.5	
		HE SPUNDOR	YŁ S			KESPONDOH 201 202 2			N CN
55 1		101	YES YES			Kt Sf 201			CO2 NUN
4UEST 10N 159		308	•	2		# n	_	æ	>
UE ST		PAHT/3UB	4 10	5	5	PAHT/SUB	5	0 1	=
5		ā				ì			

UUE STION 140	140		Ī	HUN MAS	11 51	IT DESERMINED THAT THE	Z Z	10.1	- I V		SIR	SYSIEM MET THE HEUDINEMENTS SPECIFIEDS	1 H	1001	HEME	8 811	1114	11103						
			2450001324	=	GINALLY NAKHANINE DE LINALLY INSTANTALINE SYSTEM IN UPERATION FILL DISSIBLE OF THE CENTRACE FORMAL SYSTEM IN VENIFICATION CHECK AGAINST KNOWN ANSWESTEM DID NUT MEET WE GUIND NE WULKENIS SPECIFIED COMMENT	LET MARKETING FECATION/FIELD IEST EM IN OPERACCEPTANCE IEST PENDENT VEMIFICATION AND K AGAINST KNOWN ANSWERS LATION EM DID NOT MEET REQUIRE ENUINEMENTS SPECIFIED A	NAKKATIVE J CATION/FIELD IEST IN UPERATION DENT VEKIFICATION GAINST KNOWN ANSWE TON DID NUT MEET KE QUI	NO ELECT NO ELCA NO ELCA SPEC	ANCE ANSWA KE GU	TEST AND FRS TREME D AND	WAL II	LINALLY NAWARINED LINALLY NAWARINED UNALIFICATION/FIELD IEST SYSTEM IN UPERAZCEPTANCE IEST INDEPENDENT VENIFICATION AND VALIDATION CHECK AGAINST KNOWN ANSWERS SIMULATION SYSTEM DID NOT MEET REQUIREMENTS SPECIFIED NO REGUIREMENTS SPECIFIED COMMENT	Z	00 10	MPLE	9								
PART/SUB	HESPUNDOR 101 102 103 104 105 106 107 108	105	106	101		1 001	9	= =	7 11	\$ 114	115	116	117.1	91	21 61	21 0i	15	125	124	125 1	20 13 20 13	7 128	061 951 851 751 651 651 851 551 151 051 918 118 117 118 115 118 118 118 118 118 118 118 118	95
٥٦ ٧	C02 C02		C 0 2			J	200	3	C02 C02	2 C02	C 0 2	CO2 CO2 CO2	70 0		ິ	€03	200	•		C 0 2 C)) 7n	CO2 CO3 CO4 CO5 CO5		C 0 2
9 10					-	203					C 0 2													
) 10		C 0 2	۵.				ت	C02					9	200		203	ny.	200	203					
0 10															3	203 Z03	Λı							
01 E														J	70 0									
01 F						Ų	503	C 0 2	~															
9 10	YE S																							_
, to	Z03	~		NON CO	C 0 1																			
PAHT/SUB	HESPUNDON 201 202 203 204 205 206 207	4 205	206	207	802	209 210	2 01	211 212	2 21	213 214	215	216 217 218	217 2	18 2	56 26	50 55	1 22	214 220 231 225 23 224 25	455	2.525	72 97	1 228	०६५ ४५५ ४८४ ८५४	95
0 P	C02 C02	2			-	C 0 2	ت	200	C 0 5	~ u			C 0 2	J	C 0 2		C 0 2	700 z		3	200		3	707
9 - 0								C 0 2	~			C 0 2												
01 C	C 0 2		C 0 2	C02 C02	-	2 603	200			CO 2	CO2 CO2					C 0.5	nu.		C 0 2		3	C02 C02	70J	
0 10					-	C 0 2				703														
01 €		C 0 2	•											C 0 2	ວັ	70J								
9 10																				C 0 2				
k 10	100				NCN																			

_
-
3
not s

MHY DID THE SYSIEM NUT MEET THE KEUUIKED SPECIFICATION? (URIGINALLY NARMALIVE)

A. REGUIREMENTS CHANGED

B. INITIAL ESTIMATE HAD

C. REGUIREMENTS IGNORED/CUSIOMEN ACCEPTED WITHOUT CORRECTION (ADDED)

D. SYSIEM MEI NEQUIREMENTS SPECIFIED AND/UN PRUJECT NUT COMPLETED

Y. NO REGUIREMENTS SPECIFIED AND/UN PRUJECT NUT COMPLETED

PART/SUB	MESPONDUM 101 102 103 104 105 106 107 108	3 C	3 104	10.	0	01 4	7 104		- - -	04 110 111 112 113 114 115 116 117 118 119 121 122 123 124 125 126 127 128 129 129	1 11.	= ~	11 8	4 11	5 11	=	1116	11 6)~ 1	121	1 120	77 7	124	125	126	131	128	124	1 50	
V 10		C 0 2	~						C 0 2	~					C 0 3	~1						0.03								
01 8		C 0 2	~																					203						
a 10	YES COI			00	COI YES	ø		YES	29	YES	YES COL YES COL YES	1 YE:	8 C0	1 YE	ø,	1£ S	S COI	COI YES COI	00 1		C 0 1	_	Yt S		103	C 0 1	CO1 CO1 CO1	100 100	C 0 1	
x 10																				M										
¥ 10			C 0 2	Vī		Š	NON COI																							
PART/SUB	RESPONDUR 201 202 203 204 205 206 207 208	80 2 0	3 204	1 205	. 200	P 20.	7 208	8 209	3 21(210 211 212 213 214 215 216 217 218 219 220 221 225 228 228 228 218 219 219	1 218	2 21	3 21	4 21	5 21	5 21	7 212	1 219	756	221	525	77	524	225	326	122	228	455	2 50	
4 10		C 0 3	~ i																										C 0 2	
01 8																								203						197
) 10		C 0 2	~												C 0 2	~														•
0 10			C 0 2	C02 C01 YES C01	YE	OJ S	_	YE	YES YES	S YE	YES YES	: 0	YES	SYES	'n	X	YES YES YES TES COL YES YES YES	YES	76.5	000	YES	7 K. S	¥ 5		Yt. S	YES YES	YES	11.5		
V 10	C01 NON						20	•																						
7 10												0 H	Ŧ																	

		9			ž	0				z
		<u>-</u>			NON NON NON NON	ر د د				NON NON NON
		8 15			ž	8 22				Z
		71 /			S Z	7 22	en en			Ž
		71			ÖN -	55.	YES			
		3			Š	77		1 Yt S		Z
		125	rts rts			425	_	\$ 1 4.		
		124	71.5			77	YES			
111		123			NON NON	527	YES			
4 × 1 3	vt e.)	122			200	555				Z
UK	(AE	171	¥t s			127				NON NON NON
NKU S	110)	120			C01	220				2 0 2
AND	PLE	611			NON CO	519	71.5			
× ×	Ď	118	Yt S			218	YES			
111	Š	117			NON	217				S S
DELIVERED SUFIWARE MEET THE HELFABILITY STANDARUS URIGINALLY D?	10 15	189 119 111 112 113 114 115 116 117 118 119 120 121 121 124 125 126 127 128 129 130			NON NON NON	082 622 927 122 977 527 527 527 722 127 072 612 912 112 912 512 612 512 612 612 602				2 0 2
بد چ	7 4 2	115			NON	215				NON
=	D/08	114		YES		214				NON NON NON NON
MLE) V	113	YES			213				S S
MARE	1160	112	YES YES			212				NON
sur 1	Pt C I	Ξ			S C S	211	YE S			_
# E	S S	01.			NO	918				Z O Z
. 1vE	Ž Z	601			NUN NUN NUN	502			SIN	_
. DE1	NO STANDARDS SPECIFIED (AND/OR PROJECT NOT COMPLETED) (AUDEU) COMMENT	20				80			•	Z 0 Z
DID THE L SPECIFIED A. YES	2 3	6			Š	. 70	8			4
5. A.	, , ,	90			NON NON NON	90	YES YES YES			
		1 50	rt S		Z	5 50	ES			
		7 70	_		Š	7 70	>-			NON
		03 1			Z	03.2	C 0 3			Z
		NOUR 02 1			Z Z	NDUR 02 2	J			Ž
~		WESPUNDUR 101 102 103 104 105 106 107 108			NON NON NON NON	RESPONDUR 201 202 203 204 205 206 207 208				NON NON
UUESTION 142					Z					Ž
911s		PART/SUB	۷ -	5	>	PART/SUB	V 10	3	×	>
UOE		34	5	9	6	7	•	5	5	•

QUESTION 143	£ 3.			M 4 50	A. REGUE. NOT		PEL MENI	THE DELIVERED SOFTWARE FAIL TO MEE STREMENTS CHANGED (ADDED) ENOUGH REVIEWS AND TESTING (ADDED)	NOED NAGED	FINAL ON THE	or or	111 1 46 (A	u Mt	= = =	ž	LIAB	11.11	THE DELIVERED SOFTWARE FAIL TO MEET THE RELIABILITY STANDARDSY STREMENTS CHANGED (ADDED) ENOUGH REVIEWS AND TESTING (ADDED)	1DAKD	 S						
				 		SIAN	ME T DAKU	INE S S SPE	3PEC	+ 1E b	KEL.	IABIL JR PR	117 03£ C	STANL NOT	COM	PLE	9	SYSTEM MET THE SPECIFIED RELIABILITY STANDARDS NO STANDARDS SPECIFIED (AND/OR PROJECT NOT COMPLETED) (AUDIED) COMMENT	3							
PAHT/3UB	HESPONDUM 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 150	3 104	105	1 00 1	1 20	90	1 60	0.1	=	2 11	3 11/	115	=	1117	118	5	1 021	21 16	Z1 Z1	121 8	125	126	121	128	₹ 21	9 0 1
0 10			C 0 1						ວ	COI YES	ø				100		3	103		100	107 107					
A 10	NON COI NON NON	NON N		NUN NUN NUN	Z Z	Z S	N O	NON NUN NON	z		NON	NUN NUN CO1 NUN	00	Z S Z		C01 C01	100	ž	NON NON	ż		Z	2	NUN NUN COI COI NUN	103	NON
PART/SUB	WESPONDUR 201 202 203 204 205 206 207 208	3 204	205	206 2	2 10	2 80	~ *0	10 21	17 1	7 21	, 17 s	215	216	217	218	219 2	2.05	209 210 211 212 215 216 217 218 219 220 12: 025 12: 015 218 219 218 219 218 218 219	77 72	\$ 224	1 225	246	227	228	577	982
۷ : o																						C 0 2				
# 6																						C 0 2				
0 1 0	YES COI	-	C 0 1	COI YES COI	-			YES	n						COI YES	Y E. S			0.3	COL YES YES	× × ×		Y 1 S			
× 10						I	SIM																			
	NON	NON			ž	NON	Ž	NON	0	Š	Š	COI NUN NUN NUN NUN NUN	S	NON		~	ON C	NON C01 C01	_					NON NON NON	N S	Š

OUE ST 10N 14	77.				MITICH, THE DE		146	CF C	ut sur r	DELIVENTO SUPTINE FULLUMING METHOUS DELIVENTO SUPTIMARE SYSTEM WERE USED THE FINISHED SYSTEM WAS SALIFD WITH	FULL SYS	STER STER	AL IE	SYSTEM WERE USED I MAS SALIED WITH	THOUS USED WITH	UP MEASUMING RELI-	AE AS	PKOJ UGS	ECT.	UP MEASUMING MELIABILLIY OF IN THE PHOJECT? (GILH 1977) KNUWN BUGS (AFTER	#1C1	14/2	± 0							
					F0.5	DEBUG DEBUG DEBUG CURVE A SUF SPECI SPECI SPECI NU RE NU RE	INTEGRATIONS DEBUGGED UNT TO UND CURVES OF CURVES OF SPECIAL SPECIAL SPECIAL NU KELIAR NUT COMPL	APLE TERE	N TE DW A NCWN NCWN NCWN NCWN NCWN NCWN NCWN NCW	INTEGRATION TESTING AND DEBUGGED FOR A FIXED (G. DEBUGGED FOR A FIXED (G. DEBUGGED FOR A FIXED (G. DEBUGGED FOR A SUFFINE FOR THE FOR	S TELL TO THE STATE OF THE STAT	65 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	RESOLUTION CONTRACTOR	PER S PER S UNIX TARES TARES TOD	LEN NEUD NFOUN PFO PFO FFO FFO FFO FFO FFO FFO FFO FFO	IGNATION TESTING AND BLEOKE SIGN OFF). THE SYSTE SUCCED FOR A FIXED (GIVEN) PERHOD OF THE AFIER WHISTON ROUNN BUCK WAS JUDGED FOUND UNKNOWN BUCK WAS JUDGED FOUND UNKNOWN BUCK WAS JUDGED FOUND UNKNOWN BUCK. SOF ERRORS OF ERRORS FOUND TO TIME SPENT DEBUGGING WERE SOFTWARE RELIABILITY ERROR FREDICTION MODEL WAS EMPORTED FOUNDED WAS EMPLIED AND SYSTEM FUNIT OF TIME (MIHF) AND SYSTEM SOFTEM WALL OF ACCEPTABLE LEVEL (ADDED) HELD HOLD WAS EMPLOYED (AND/OR RELIABILITY MEASURING METHOD WAS EMPLOYED (AND/OR TERM	NKN SUGG MUD MUD MUD MUD MUD MUD MUD MUD MUD MUD	THE AFT OF SYS	SAYS EUDEN EUDEN ENGEN SAFE ND C	INTEGRATION LESTING AND BEFORE SIGN OFF). THE SYSTEM WAS THEN DEBUGGED FOR A FIXED (GIVEN) PERHOD OF THE AFTER WHICH THE KATTO OF FOUND KNOWN BUGS WAS JUDGED EQUAL TO THE MATTO OF UNKNOWN BUGS, BY STOKED TO THE SPENT DEBUGGING WERE CALCULATED A SOFTWARE RELIABILITY ERROR PREDICTION MODEL WAS EMPLOYED SPECIAL TEST DRIVERS WERE EMPLOYED TO STREAM ACCEPTED WHEN ERROR RATE REACHE O ACCEPTABLE (MIB) AND SYSTEM (ADDED) WHEN ERROR RATE REACHE O ACCEPTABLE (MIB) AND SYSTEM ACCEPTED WHEN ERROR RATE REACHE O ACCEPTABLE (EAVEL (ADDED)) NO RELIABILITY MEASURING METHOD WAS EMPLOYED (AND/OR PROJECT OUTHER	WAS H TH DUCKL OYED DOED RULK		2 = -							
PAKT/SUB	RESPONDOR 101 102 103 104 105 106 107	0 1 104	901	2 10	9		90	30	0.7	=	112	= 1	7	=	2 = 2	11 9	~	81	<u> </u>	021	121	122	123	124	125	126	121	128	129	0\$ 1 621 921 221 921 521 521 521 121 130 141 411 411 411 511 511 511 511 111 011 601
8 10												7 E S		Y & 3	တ									YES						
01 €	C 0 2																													
v 10																	I	HIS							N T					
Å 10	NON	NON NON	>	N	NUN NUN		NO.	NO	NON	NON NON NON NON	NON		NON	_	00	COS NUN	ž	2	4 NO	NON NON NON NON	200	NO.	NO.			NON	NON	NUN NON COL CUI NUN	00	S
7 10			01н	I																										
PART/SUB	HESPUNDUK 201 202 203 204 205 206 207	03 204	502 F	5 20	Ž 9		7 90	208 209 210 211	012		215	213	214	12	5 21	6 21	2 7	18 2	61	, 025	122	277	225	524	215 216 217 218 219 220 221 222 223 215 415	226	122	052 425 828 428 928	444	Z 50
0 I A			C 0 3	~													>	Yt S									TE S			
0 1 B				YES	s		-	YES														X :S				Yt. S				
01 C										YES			YE S																	
0 10	C 0 2				ت	C 0 2																								
01 E														00	C02 C02	~							YES	7 E S				707		
× 10	£	2 E																												
01 Y	NON	NON	-			Z	NON	_	S		NON	NON NON				NON	ž		-	NON NON	202				NCN				S	NON NON
7 10																		Э	H											

		109 110 111 112 115 114 115 116 117 118 119 120 121 123 124 125 126 127 128 129 150		:0	COI NON	012 622 822 127 927 527 627 527 277 127 028 612 612 512 512 512 512 517 517 518	s Yt S	NON
		126		S I M	•	1. 22.1	YES YES	
		2			NON NON	127	=	_
		126			Š	977		S
		255	107			527	YES YES	
		124			(0)	224	YES	
		123			NUN NUN CO1	223		C 0 1
<u>-</u>	20 20	122			202	277		NON NUN NUN CO1
MAINIAINAHILIIY	STANDARDS COMPLETED) (ADDED)	121	¥ Ł S			177		ž
V V V V V V V V V V	40.5 11.0.3	120			NON NON	220		NON
Z Z	APLE 4PLE	611			2	219	COI YES	
₹ #	200	118		N S		817	0.0	
= T	108	1117			Z C Z	217	•	NO.
ž	DAEC	116			ž	216		N O N
=	2 X X X	115			NON NON NON NON	215		Z
DELIVERED SUFINARE FAIL TO MEET INC	SUFTWAKE MET THE SPECIFIED MAINTAINAHILITY STANDAHUS NO STANDAHUS SPECIFIED (AND/UK PHOJECT NOT CUMPLETED CUMMENT	114			N S	214		NUN COI NUN NUN NON NUN
A A A	1+ 1+ 0 0 (A)	11.5	YES			213		C 0 1
sot	SPEC.	112			CUI	212		S S
נאנה	SPEC	=			NON NON NON CO.	711	001	
<u> </u>	46 3 40 S	9			NON	210		NON NON
ā ₩	AKE INDA	501				209		NO.
I O I	JF TW.	108			NON	208		NON
MHY DID THE STANDARDS? A.	3 Z Z	101			NON NON NON	207	003	
8 × 5) d × ~	901			NON	MESPUNDOH 201 202 203 204 205 206 207 208		NON
		105	100			502	C 0 1	
		70			NON CO2	204		NON
		JK 103			ZOZ)¥ 203	COI YES	
		RESPONDOR 101 102 1	100			HE SPUNDOH 201 202 20	C 0 1	
9					NON	HE S.		NON
N 0		'SUB	9	×	>	'SUB	٩	-
UUE ST 1 UN 1 4 6		PANT/SUB	0 1 0	0		PAH 1/3UB	0 1 0	01 Y
_		•				-		

4
-
Š
-
_
9
ă

MHICH IF ANY OF THE FOLLOWING METHODS OF MEASURING THE MAINTAIGABILITY A. MEASURED THE TIME TO REPAIR THE FIRST N NUMBER OF BUGS REPORTED (AFTER INTEGRATION TESTING AND JUST BEFORE SIGN OFF) THE AVERAGE TIME TO FIND A BUG BECAME THE MEAN TIME TO REPAIR (MITH). B. SALTED THE FINISHED CODE WITH KNOWN BUGS. THE AVERAGE TIME TO FIND AND REPAIR THE KNOWN BUGS BECAME THE MENATE (MITH). C. COST TO MAINTAIN PROGRAM PER UNIT OF TIME AND ACCEPTED WHEN COST REACHED AN ACCEPTABLE LEVEL (ADDED). Y. NO MAINTAINABILITY MEASURES WERE EMPLOYED AND/OR PROJECT NOT	13 104 105 1
COK 31 10 10 10 10 10 10 10 10 10 10 10 10 10	RESPONDOR PART/SUB 101 102 10

		1) •			,	•	•		:	:		:	:	:	:	•	:	•		2	0 2 0	-	00 12 12 12 12 12 12 12	2		
V 10										¥	YES																
x 10	E I S		N I S	တ											SIN						E IS		Σ	<i>s</i>			
¥ 10	0 100	C01 C02	25	C01	CO1 CO2 CO2 CO	C 0 2	_	703	CO2 CO2 CO3	20	00	501 C01 C01 C05	C 0 1	20 3		0 100) 20:	ت اء	00 11	CO1 CO5 CO1 CO1 CO5 CO1		NON COI	5	100	COI NON		
7 10										UTH	I																
PAR I / SUB	HESPONDON 201 202 203 204 205 206 207 208 209	205 20	14 20	5 206	207	208		210 211	5 11:	12 21	3 210	4 215	917	217	218	519	2 02:	57 57	? ?	3 224	522	226 4	,2 15:	477 827 127 977 527 427 527 777 177 057 618 817 118 917 518 818 818 818	0 2 5 0		
V 10									YE S						YES								YES	71.5		203	
01 C																				C 0 2							
× 10	•	E I S	E S	တ	S E																S E						
7 10	CO2 CO1	C 0 2	25	100		NON CO	_	103	ت	0J 10	C01 C02 C02 C03 C03 C03	2 00	£ 00 3	C 0 3		J) IO:		00 1			€05			193		
7 10															_	0 TH							3	HIO HIO	_		

UUE STIUN 148	20 27		MADE 3 (UMADE 3 (UMAD	0 x 0 D = x	DELIVERED SYSTEM IS TO BE TO B	FLIVERED SYSTEM OF STREET IN THE WARNER TO SYSTEM IS IN USE SYSTEM IS IN USE SYSTEM IS IN USE STORE WAS NOT SEEN AS NOT SATISME SYSTEM WAS NOT SATISME SYSTEM WAS NOT SATISME.	THE DELIVERED SYSTEM USABLE? IF SO, HUM WAS TOWNGINALLY NAMMATIVE) TES, SYSTEM IS IN PRODUCTION TES, SYSTEM IS IN USE TYS, SYSTEM IS IN USE TYS, INDEPENDENT VEHIFICATION TESTING TYS, FIELD UN GUALIFICATION TESTING TYS, COSTOMER WAS SATISFIED ND, USER WAS NOT SATISFIED NO, THE SYSTEM WAS NOT DELIVERED/CANCELLED UTHER	SABLE DC 110 UC 110 IC A 11 SF 1E 0 DE TERO DE LE 0	N N N N N N N N N N N N N N N N N N N	SO, P	SU, MUM WAS THIS DETERMINATION VALIDATION NG	9 Z	18 01	± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ±	NA 1.1	z					
PART/SUB	RESPONDUR 101 102 103 104 105 106 107 108	04 105 10	6 107		11 60	0 111	112	113 1	11 71	9119	117	81	Z1 61	171 0	122	123	1 421	109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 124 130	27 128	129 13	9
V 10					C 0 2																
0 1 B	C 0 2	C 0 2		J	Z 0 3		C 0 2		C 0 5	•	C 0 2		YE 3	ø	207 203	707				700	
01 C													Yt S	တ	C n 2						
0 10	C 0 2	C02 C02	2		C 0 2	Ň		C 0 2		C 0 2	J	C02 C02	~						203		
01 F	C 0 2													703							
9 10																	J	C 0 2		707	7
× 10								X	X I S							•	SIN	N S	3 I I		
٠ ١ ١			C 0 2	CO2 CO2		C02															
PAKT/SUB	HESPONDOM 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230	04 205 20	6 207	208 2	12 60	0 211	212	213 2	14 215	216	217 2	18 21	19 22	0 221	242	577	2 42	5 977 57	27 228	224 25	2
01 B		C05 C05	~			C 0 2		C 0 2	C 0 2	•				C 0 2			ت	207 207 207		C 0 2	
0 10	C02 C0	C 0 2	C02		CO2 CO2	~	C 0 2	ū	203	C 0 2	J	02 CC	203 203 203	٦.		707			C 0 2	707	3
9 T E										C 0 2						•	203				
01 F											C 0 2										
v 10	UNK														S E						
01 Y	703			Z C Z																	

CUE STION 189	6			~ < C C B > E	-	I WAS THE PEK I YEAK 2-YEAKS 5-5 YEAKS 6-DH MONE YE NU WANKANIY UTHEK	K K K K K K K K K K K K K K K K K K K	THE PERSON INS IT ARS MONE YEARS WHRANTY	3 3 3 8	=	Ξ	¥ z	THE PERIOD OF THE FINAL PRUDUCT MAKKANIY? INS INDME YEARS INDME YEARS INDME YEARS	• -	X X A	<u>></u>												
PAH 1/SUB	RESPUNDUR 1 101 102 103 104 105 106 107 108	3 104	105	106	107	108		911	=======================================	115	51	11.	051 621 821 221 921 521 821 221 121 021 61 118 111 111 111 111 111 111 111 111	116	111	118	5 =	0. 7 1	121	122	123	124	125 1	1 921	27 1	1 87	- 52	95
A 10		-	YES	YES YES										YES													>	YES
x 10																							•	N N				
¥ 10	NON NON NON NON	NON			NC.	NON NON		N S N	NO.	NC	NO.	N C	NON NON NON NON NON NON		N S N	NON NON NON	Ž		Ž	NUN NUN NON NUN NUN	NON	NON	NON	Z	N S	NON NON NON	Z C	
7 10																		отн										
PART/SUB	HE SPUNDOH 201 202 203 204 205 206 207 208	3 204	205	206	207	208		210	117	212	213	214	209 219 215 215 215 215 215 215 225 225 125 025 WIS 815 715 215 215 215 215 215 215 015 205	216	213	218	219	220	122	777	572	5 427	, ₹	7 97	2 12	7 97	~ ₹	95
V 10								YES					X t S						YES YES	Yt S						-	YES	
9 10															YES YES	Yt S												
01 0																			•						>	rt s		
0 10																							Yt. S					
x 10	SIN	s								S T																		
V 10	NON NON	NON NON NON NON	NON	NON	NON	NON	202	_	S	_	NON	NON NON	_	NON			NON NON	NO.		-	NON NON	202	-	NON NON	NO.		Z	ROR

	01 C 01 X M1/SUB	RESP 201	UNK RESPUNDOR 201 202 203	¥ 8	04 20	505 20	2	101 102 103 104 105 106 107 108 003 000 020 020 015 015 040 040 005 005 005 005 005 005 005 00	106 1 005 0 005 0 005 0	000 050	100 110 111 112 113 060 060 000 000 000 000 000 000 000 00	7 11 71 71 71 71 71 71 71 71 71 71 71 71	000 000	004	M	215	N/A N/A 210	00	218	109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 060 004 011 005 004 011 001 050 040 013 015 004 025 007 010 100 020 005 MIS N/A MIS UNA MIS 22 22 224 225 224 225 226 227 228 229 259 250	M15	10 01 27 (011 122 020 020 008	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	\$ 124 004 012 8 224	124 125 126 127 009 025 007 010 012 007 015 005	5 126	1 010 7 015 005 005 005	7 128 5 MIS	8 129 8 UNK	0118
01 A 020 016 068 015 015 003 004 005 004 004 003 004 015 015 016 015	4	050	-0	۵	90	10 95	15 0	15	•	506	700	500		000	700	003	700	10	- 015	110 1	, 01.	٠,	0	10 5	0 01	015 010 010 030 015	0 0	'n	0.2	050 010 070	^
01 tb 100 024 088 008 00¢ 00¢ 00¢ 012 020 050 UNK		100	0.5	4	30	38						900		100	000	00	006	015	970	1 050	_		S	S C	K 020	0 0 0	0 0 0 0	٥	035	5 0 Z	^
01 C 005 008 028 028 004 002 002 001 002 010 010 NEG UNK) I	005	00	20	0.	80						004		700	900	100	00	010	010	NE E			2	UNK UNK	K 005	5 01	500 010	S.	00	800 S00	_
OIX MIS UNK UNK DIS	×		N I S	Ś	¥			5	X				o I s									ĭ	10					Š	¥		

	4
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
Ì	4
	2
	i
	Ξ
	Ξ
	=
	4
	-
	2
	i
:	-
3	Ξ
-	1
2	ž
	×
3	***
ì	_
	•
	7
•	•
-	2
٠	
3	
-	_

UUL 811UN 151

18 189 119 111 115 113 114 115 116 117 118 119 120 121 123 124 125 126 121 118 119 120 120	010 020 028 MIS OUB UNK MIS 010 N/A 100 050 030 MIS UNK MIS UNK MIS MIS MIS 250 005 UNK UNK
128	1 400
171	350
126	2 1
571	Σ Σ
124	Z Z
123	Ş
122	N
171	Š
120	N S
6 -	030
	0.50
111	100
-	N/N
=======================================	010
	N N
= 2	N C
=	9 00 5
Ξ	Z z
~	170 0
0 2	0 02
101 /	
01 9	8 20
2 5	5 00
9	¥ 02
2 20	S C
IDUR 12 18	1 0
RESPONDUR H 101 102 103 104 105 106 107	15 01
Z =	ī
PAN1/SUB	01 001 MIS 010 MIS UNK 025 008 200

	1 50	000	750	700
	124	Š	7	
	128	<i>27</i> Ξ	977	Z Z
	127	050	123	250
	126	990	526	9
	125	010	577	010
	124	100	524	210
	108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129	020 005 040 018 100 160 025 020 MIS 040 100 006 MIS UNK 075 UNK 100 010 060 050 MIS	827 127 922 527 527 527 227 127 922 KIZ 812 112 912 512 512 512 512 512 812 808	MIS 103 050 050 UIS 050 050 070 050 027 050 030 MIS 006 017 UIZ 010 UIU 052 UNK 004
	122	910	275	900
	121	Z Z	122	2 2
	120	SIW	220	030
	<u>-</u>	900	219	030
	<u> </u>	001	812	050
	117	040	217	027
	9 -	<u>x</u>	216	050
		070	215	070
	7 -	670	214	050
	115	160	215	050
	7	100	717	o I s
	=	619	211	050
	-	040	210	050
	104	500	508	100
	90	020	208	S I
	107	900	207	015
	90-	0 5 0	706	016
	201	010	205	270
	* 0	900	204	S X
¥	103	\$10	¥6. 205	015
HE SPUNDON	701	2	HESPUNDUM 201 202 2	N S
HE ST	=	610	HESF 201	110
	308	01 001 014 015 008 010 050 008	SUB	UI GOI 011 MIS 015 UNK 022 UI6 015
	PART/SUB 101 102 103 104 105 106 107	6	HESPUNDUR Pahl/sur 201 202 203 204 205 206 207	5

WHAT WAS THE CUST PER LINE UP LOUE?

UUE ST J UN 152

~
S
_
-
ž
=
=
ø
3

MAS SUFIMARE DEVELOPMENT THE PALING FACTOR (CRIFTCAL PAIN) ON THE PROJECT? A. YES, MANDMAKE WAS DEVELOPED ANEAD OF SOFTWARE B. NO. SOFTWARE WAS DEVELOPED ANEAD OF MANDWARE C. YES, PRUJECT WAS ALMOST ALL SOFTWARE D. NO. MARDWAKE AND SOFTWARE DELIVENED TOGETHER (ADDED) E. VARIED MARDWARE AND SOFTWARE ALTERNATED (ADDED) Y. PRUJECT NOT COMPLETED/THERE WAS NO PACING FACTOR (ADDED) 2. UTHER								
MAS SUFIMARE DEVELOPMENT THE PALING FACTOR (CHITICAL PAIN) ON PROJECT? A. YES, MANDWARE WAS DEVELOPED AREAD OF SOFTWARE B. NO. SOFTWARE WAS DEVELOPED AREAD OF MANDWARE C. YES, PROJECT WAS ALMOST ALL SUFTWARE D. NO. MANDWARE AND SOFTWARE DELIVERED TOGETHER (ADDED) E. VARIED MANDWARE AND SOFTWARE ALTERNATED (ADDED) Y. PROJECT NOT COMPLEILD/THERE WAS NO PACING FACTOR (ADDED) 2. UTHER	Ξ							
MAS SUFIMARE DEVELOPMENT THE FALING FACTOM (CNITICAL PATH) PROJECT? A. YES, MANDWARE MAS DEVELUPED ANEAD OF SOFTWARE B. NO. SOFTWARE MAS DEVELUPED ANEAD OF MANDWARE C. YES, PROJECT WAS ALMOST ALL SUFTWARE D. NO. MANDWARE AND SOFTWARE DELIVENED LOGETHEM (ADDED) E. VARIED MANDWARE AND SOFTWARE ALLERNATED (ADDED) Y. PROJECT NOT COMPLETED/IMER MAS NO PACING FACTOM (ADDE	Ž						3	
MAS SUFIMARE DEVELOPMENT THE FALING FACTOR (CHIFICAL PROJECT) A. YES, HARDMAKE WAS DEVELUTED AREAD OF SOFTWARE B. NO. SOFTWARE WAS DEVELUTED AREAD OF HARDMAKE C. YES, PROJECT WAS ALMOST ALL SOFTWARE D. NO. HARDWAKE AND SOFTWARE DELIVERED TOGETHER (ADIE: VARIED HARDWARE AND SOFTWARE ALIENATED (ADDED) Y. PROJECT NOT COMPLETED/INERE ALIENATED (ADDED) 2. UTHER	PAIH				1010		CADDE	
MAS SUFINARE DEVELUPMENT THE FALING FACTOR (CNITTED PROJECT) A. YES, MARDMARE MAS DEVELUPED AREAD OF SOFTWARE B. NO. SUFFWARE WAS DEVELUPED AREAD OF HARDMARE C. YES, PROJECT WAS DEVELUPED SOFTWARE D. NO. MARDMARE AND SUFTWARE DELIVERED HOGETHER E. VARIED MARDWARE AND SUFTWARE ALIERNATED (ADDEVE PROJECT NOT COMPLETED THERE ALIERNATED (ADDEVE PROJECT NOT COMPLETED THERE WAS NOT PACING FACTORISTS.	CAL				Š	=	10,	
MAS SUFINARE DEVELUPMENT THE FALING FACTOR (C. PROJECT) A. YES, MANDWARE MAS DEVELUPED AREAD OF SOFTI B. NU. SOFTMARE WAS DEVELUPED AREAD OF MANDW C. YES, PROJECT WAS ALMOST ALL SUFINARE D. NU. MANDWARE AND SOFTWARE DELIVENED TOGET E. VARIED MARDWARE AND SOFTWARE ALTERNATED (Y. PROJECT NOT COMPLETED LOSTING.) 2. UTHER	=======================================	MAKE	AKE		7. 7.	AUUE	FAC	
MAS SUFIMARE DEVELOPMENT THE FALING FACTOR PROJECT? A. YES, HARDMAKE MAS DEVELUTED AREAD OF SET ON SOFTWARE WAS DEVELUTED AREAD OF HAS NO. NO. NO. NAKEMAKE AND SOFTWARE DELIVERED TO E. VARIED HARDWAKE AND SOFTWARE ALTERNATE Y. PROJECT NOT COMPLETED/INER MAS NO PACE.	3)	Ē	X CM		15 E	ے	N.	
MAS SUFINARE DEVELUPMENT THE FALING FAI PNDJECT? A. YES, HARDWAKE WAS DEVELUPED ANEAD OF B. NU. SUFINARE WAS DEVELUPED ANEAD OF C. YES, PHOJECT WAS ALHOST ALL SUFINARE D. NU. HARDWAKE AND SUFINARE DELIVERE E. VARIED HARDWARE AND SUFIWARE ALIEN Y. PRUJECT NUT COMPLETED/THERE WAS NU.	X 0.	s ±	₹ 1	بد	=	MATE	PAC	
MAS SUFINARE DEVELUPENT THE FALING PROJECT? A. YES, MANDWARE MAS DEVELUPED ANE B. NU. SUFINARS MAS DEVELUPED ANE C. YES, PRUJECT MAS ALMOST ALL SUF D. NU. MANDMARE AND SUFINARE DELIVE. VARIED MARDWARE AND SUFINARE ALL Y. PRUJECT NUT COMPLETED/THERE MAS.	4	3	3	MM	FRE	₹ =	Š	
MAS SUFIMARE DEVELUPMENT THE PARTICLE A. YES, MANDMARE WAS DEVELUPED B. NU. SUFIMATE WAS DEVELUPED C. YES, PRUJECT WAS ALHUST ALL D. NU. MANDMARE AND SUFIMARE DE E. VARIED MANDMARE AND SUFIMARE Y. PRUJECT NUT CUMPLE LEDZIMARE 2. UTHER	9 N F	Att	IH A	SUF	7	7	MAS	
MAS SUFINARE DEVELUPMENT THE PROJECT? A. YES, HARDMAKE WAS DEVELUE B. NU. SUFINARE WAS DEVELUE C. YES, PRUJECT WAS ALHUST D. NU. HARDWAKE AND SUFINARE E. VARIED MARDWAKE AND SUFINARE Y. PRUJECT NUT CUMPLETED/IN 2. UTHER	FA	rtt	12	ALL	₹ ₩	MAK	ž ž	
PROJECT? A. YES, HANDWARE WAS DEVEN, NO. SOFTWARE WAS DEVEN. C. YES, PROJECT WAS ALM. D. NO. MANDWARE AND SUFTWARE WAS DEVEN. E. VARIED MARDWARE AND SUFTWARE WAS SUFTWARE	Ĭ	1110	3	15.	MAK	Suf I	= :	
PROJECT'S A. YES, HARDMAKE MAS B. NO. SUFFMANT WAS C. YES, PRUJECT WAS D. NO. HARDWAKE AND E. VARIED HARDWAKE Y. PRUJECT NUT COMPLIANCE 2. UTHEN	ž	=	7 7	ALM	Sct 1	3	111	
MAS SUFIMANE DEVEL PNDJECT? A. VES. MANDWAKE B. NU. SUFTMANE C. YES. PNUJECT V E. VARIED MANDWAKE V. PRUJECT NUT CO. 2. UTHER	3	MAS	2 Y 1	8 Y 1	Ž	# ¥	14	
MAS SUFIMARE E- PROJECT RANDM A. YES, HANDM C. YES, PRUJECT D. NO. HANDMA E. VARIED HANDMA Y. PRUJECT NO. 2. UTHER	t ve L	AKE	2	<u>-</u>	7 2	UMA	2	
AAS SUFINAL PROJECT? A. YES. TA B. NU. SUF C. YES. PR D. NU. HAK V. PKUJECT Z. UTHER	ž ž	¥ C	¥ H	O.S.	DIE	¥	Z	
PROSECT PROSECT PROSECT C. YES D. NUC V. NUC V. NUC V. NUC V. VEC V. V. V	MAN	ì	Š	₹.	HAH	110	JECI	3
SAF CONTRACTOR	SUF FCT	X	Š	Yt S	Š	XYX	FRO	3
	PROJ		2	ن.	å	بد.	,	۲.

PART/SUB	MESFORDIN PAMI/SUB 101 102 103 104 105 106 107 108	3 104	\$01 B	> 106	101	108		116	=	711	113	114	115	116	1117	1 18	÷::	120	121	109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 150	125	124	1	7 97	17 12	15	2 - 2	э
V 10	16.9	en en							YES	1 rt.s		rt s			YES				YES		TES YES	¥ s		Z	rks			
£							YES							7 £ S		YES										500	~	
3 10		¥ £ 9	YES YES		YES	YES YES											16 s			71 S		_	8 12				500	.
0 10	C 0 2			C 0 2							C 0 2		C 03										>	71.5				
01 E	C02							C 0 2																	C 0 2	~		
x 10				•										•				SIN					•					
PART/SUB	RESPUNDUR 201 202 203 204 205 206 207 208	1 204	502	506	207	208		210	211	212	215	214	215	216	217	218	516	220	127	209 219 211 212 215 214 215 217 218 219 220 221 222 223 224 225 215 214 215 215 209 259	223	2 #25	7 57	7 97 70	22 7:	8 22	\$ > \$	
۷ TO		YE S					YES	_	YES	ند				YES							YES		F	YES YE	YES YES	'n		209
9 10	x	ø.	¥	YES YES YES	YE 9						YES				YES	YES VES YES	YES		YES YES	Yt s								
01 C	YES									YES			YES	YES YES				YŁS			_	rts rts	8			X 82	s rts	•
0 10								C 0 2				C 0 2																
x 10	212					HIS																						

126 127 128 129 130 015 010 008 020 020 008 020 020 010 020 020 010 020 020 010 020 010 020 020 010 020 020 010 020 020 010 020 020 010 020	124 125 126 127 010 015 010 015 015 010 015 020 020 010 010 020 030 010 020 030 010 020 010 010 020 010 010 020 010 010 020 010 010 020	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	MIS MIS 625 5 625 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	010 015 010 010 010 010 010 010	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	122 0010 0020 0040 0013 0013	121 122 010 010 020 020 020 020 020 010 010	HIS 550 550 050 050 050 050	10 010 10 010 11 218 219 220 221 222 223 224 225 10 010 10 010 10 010 11 218 219 220 221 222 223 224 225 12 010 010 13 010 020 020 010 015 14 010 020 020 010 015 15 010 020 020 015 015 020 16 010 17 218 219 220 221 222 223 224 225 18 010 010 19 010 19 010 10 010 10 010 10 010 11 218 219 220 221 222 223 224 225 12 010 010 13 010 020 020 010 014 006 010 015 14 010 020 020 015 015 017 015 015 15 010 030 020 030 010 007 030	000 010 010 010 010 010 010 010 010 010	11		1115 010 020 010 010 010 010 010		. e e e e e e e e e e e	FESTI 66 60 610 610 610 610 610 610 610 610 6	FESTON TESTON TE			7 208	C C C C C C C C C C C C C C C C C C C	105 106 015 000 015 005 010 010 020 010 010 010 010 010 010 010	105 020 020 015 015 010 010 000 040	H 103 104 103 104 103 104 10 10 10 10 10 10 10 10 10 10 10 10 10	UNDOH 102 103 020 010 020 010 020 010 020 010 010 010 030				
		0 7 0	010	015	870	070	050	070		010 050	100	010	250	010	200		070	030	050	020 020	0 2 0	025	919	010	070			01 E	•
			010	015	870	0 7 0	050	070		050	100	010	025		200			0 3 0	0 2 0	0 2 0	0 2 0	0.25	015	010	070				•
			•	4	3	9		•				•	,		4				400	,	ć		,	•					•
h≥0 010		د کی	0 4 0	0 2 0) n o	3 10	0	0 2 0		010	52	010	650	070	010		070	- - -	015	0.20	0 2 0	010	040	070	070	_	6 5		•
010 070				015	017	910	615	070		010	610		010		090		070	910	010	0	070	070	005	040	030	_	970		9
010 070		010	015	010	900	0 1 4	010			010	100		010	900	010			500	015	0	0 7 0	010	000	010	010	_	010		•
				0 7 0	000		900		010			000			010		070		070	015			013	010	010		510		•
428		446	525		223	222	172	220	219			216	215	214				210	508	208	207	206	205	504	OH .	3PONI 1 202		I/SUH	×
									NO.																				c
			<u>ν</u>				CNK	S E																					9
		010		030	010					010			610	070	070	070	010	010	015	000	600	070	010	900	010	0 5 0	010		•
Š		010		010	040					010				070	919	010				900	015	010	015	900	0 35	0 8 0	980		•
		070		910	010	070				040				050	615	510				035	040	070	015	030	979		950		•
Š		0 7 0		070	910					625	020			0 \$ 0	020	070	010			070	017	070	070	945		070	026		•
Š		015		910	010	010				010				010	910	010	010		010	5	011	915	070	010	010	070	910		0
Š	010	015		010	015	010				005	÷.	> = =	010	010	570	970	0 0	500	015	3	000	015	070	005		_	010		•
1 621 821	121	126	125	124	123	122	121	120	119	118	1117		115		113		1:1	100		108	101	104	105	104	0K 103	1 1 0 Z		1/8UH	*
									* *					3	AUDE		. in	ว -	ž	SMME	₹5	-~							
									* * *								- - -	2 2 2	=======================================	1215		.							
									***	•	:				ž	1.51	=	5/5	HHI	40CK		٥							
									****	* * * *	++							1 GN	. 06	IVI		J							
								_	***	, ,	,					_	5	5	¥ Z	÷ .:		2							
										444	•						7			•									

	۰		s				2		211		:P		
	2		165				25.	YES			X + S		
	109 IIO III 112 126 127 128 120 121 121 120 121 121 121 121 121 121				MIS MIS		209 210 211 212 215 214 215 217 218 219 220 221 222 223 224 225 226 227 228 229 230						COS NUN
	128				T T		228						C 0 5
	127	7 t s					227	Yt S					
	126					NO.	226	res yes					
	521	¥ 5					225						X 0 X
	7				SIM		224	YE S					
	57				7	Z S	8						3
£	77					NON NON	2 2						NON NON
	1 17		YES			Z	212	YE S					Ž
IF THE PROJECT USED UN-LINE, INTERACTIVE PROGRAMMING FOR PRUGRAM DEVELOPMENT, MAS 31 A. A HIGHLY EFFECTIVE DEVELOPMENT TOOL B. EFFECTIVE IN SOME CASES C. OF LIMITED UTILITY D. A DRAIN ON HARDWARE RESOURCES E. A NICE TOY Y. ON-LINE, INTERACTIVE PRUGRAM WAS NOT USFD/UNKNOWN Z. OTHER	20 1		>		S I W		2 03	Ξ	ဟ				
<u>.</u>	<u> </u>				Ī	ž			YES YES YES	•			
MINI	= =	s				NON	8 21		S YE				
G.KAM D.Zun	7 11	YES				,	7.21		¥				_
PRU	=				•	NON	7						N C N
FOURT USED ON-LINE, INTERACTIVE PROGRAMMING TAN, MAS 31 SHLY EFFECTIVE DEVILUPMENT 1001. CITIVE IN SOME CASES IMITED UTILITY AND MARDMARE RESOURCES E TOY INE INTERACTIVE PROGRAM WAS NOT USED/UNKNOWN	Ē				E S	_	216	YES					
COJECT USED ON-LINE, INTERACTIVENT, MAS 11 SHLY EFFECTIVE DEVELOPMENT TOOL SHIVE IN SOME CASES IMITED UTILITY IN ON MARDMARE RESOURCES E TOY INE INTERACTIVE PRUGRAM WAS NO	115					S	215						Z S
COJECT USED UN-LINE, INTERNAL INTERNAL INTERNAL INTERNAL CASES INTERNAL USE CASES INTERNAL IN	1.14				N S		214	YES YES					
VELOUS SOURCE	113	YES YES					215	YES					
CASI CASI	112	YES					212			Yt S			
D ON TIVE	Ξ					NON	211	Y t S					
IF THE PHOJECT USED UN-LINE DEVELUPMENT, WAS IT A. A HIGHLY EFFECTIVE DEVEL B. EFFECTIVE IN SOME CASES C. OF LIMITED UTILITY D. A DRAIN ON MANDWARE HES E. A NICE TOY Y. ON-LIME, INTERACTIVE PHI Z. OTHER	1.0					NON NON	510						503
COLECT CHIVE CHIV CHIV CHIVE CHIV CHIV CHIV CHIV CHIV CHIV CHIV CHIV	501	YES					60						NON COS
HE PHO LUPMEN A HIGH EFFECT OF LIM A DRAIN ON-LIM OTHER	_					NON						8	Z
THE PRESENT A HIGHER A DRA A DRA A NIC ON LI ON	01		YES			~	2 10					RIS HIS	
24 t 0 C 5 + E	90		~			NON	7 90		YES			I	
	1 50		93			Ž			Ŧ				z
	7		res res	Yt s							n		NON
	7		Ξ	7		z	3 20		ø		YES		
	RESPONDUR 101 102 103 104 105 106 107 108				æ	NO.	RESPUNDOR 201 202 203 204 205 206 207 206		YE S			so.	
	RESPONDON 101 102 1				n T	z	RESPONDOR 201 202 2					SI	
60t 8 TI ON 155						NON	20.						NON
90 I	'SUB	~	•		×	>	3u8	•	z	U	2	*	>
e s	PAHT/SUB	5	5	5	6	6	PAK1/3UB	5	5	5	9	5	6
J	1						2.						

211

UUE 3 [10N 150	150				- N	YOUR	T X T	CIT	F CF	KET U	2 L Z	H CH	NO 1	HE EXPERIENCE REFLECTS THAT UN-LINE, EFFECTIVE 1001, IN WHICH STIUATION	IF YOUR EXPERIENCE REFLICIS INA! UN-LINE, INICHACIIVE PRUGHAMMING HAS AN EFFECTIVE TOUL, IN WHICH SITUATION HAS IT MUST EFFECTIVE?	INICHACTIVE MAS IT MOST	MOS	¥ = =	PRUCKAMMIN	9 × 1 × 1 ×								
					5 4 5 0 0 0 2 7 ~	A. CCHECK B. TO C. DUK D. CUK F. NUI Y. CIU	HENG NOT	NANK DE VE SHUN DE BL TE S I E F F F	HECK OH MANK ORDER) DUMING DEVELOPMENT TO THY SHORT LENG DUMING DEBUGGING DUMING TESTING NOT AN EFFECTIVE TO DE NOT USE UN-LINE OTHER	CK UR MANK UNDER) DUKING DEVELOPMENT OF TO THY SHORT LENGTH U DUKING DEUUGGING UUNENG IESING NUI AN EFFECTIVE TUUT DID NOT USE UN-LINE, OTHER	UN HANK UNDER) HING DEVELOPMENT OF CODE THY SHUKE LENGTH UF CODE HING DEBULGING HING TESTING HING TESTING O NOT USE UN-LINE, INTERAC	ubt Cobt	F UK	POSS	I UH HANK UNDER) MING DEVELOPMENT OF CODE THY SHORT LENGTH UP CODE FUK PUSSIBLE US! (SIMULATION APPRUACH) THY SHORT LENGTH UP CODE FUK PUSSIBLE US! (SIMULATION APPRUACH) MING DEBUIGOIN. THING IESTING. THE AN EFFECTIVE TOUL TO NOT USE UN-LINE, INTERACTIVE PROGRAMMING/UNRNUMN THE	USł M] NG	(ST	AUL A I	2	44 74 K	1 4C H)							
PAM 1/SUB	KESPONDUH 101 102 103 104 105 106 107	10 M	104 1	4 50	90		68 9	70	0.		15 1	1 5 1	= =	11 51	08 199 115 115 115 115 115 121 521 521 521 121 1	7 11	=	150	121	122	125	124	5.21	1 921	1 17	97	51 63	2
4 10		_	400		_	YES	•	004		>	YES YES	30												>-	yt S			
9			~	YES			•	700								YES	:n											
) 10		-	003		-	YES Y	YES 0	100		>	YES YES	S .							Yt.s				11 S				YES	33
0 10		-	200			>	Yt \$ 005	501																			8 1 L	23
01 t		-	100																									
×	SIE											I	S I S	N I S	တ			MIS				π Έ			1	H S H	S I N	
> 10	NON	NO N		Z	NON			Z	NON NON	N			ž	NO.	NON	z	NON	-		NON NON	NO.		-	NCN				
PART/SUB	HESPONDOH 201 202 203 204 205 206 207	OH 205	204 2	2 50	2 90		2 80	50	208 209 210 211		212 213		2 71	214 215 216	6 217		21.7	22.6	221	777	22.5	724	. 525	7 97;	052 622 822 122 922 522 822 522 222 122 022 612 812	28 2	52 52	2
0 1 A	100	YES										>	Yt s			00	001 YES	•	Yt S	rts rts				YESY	Yt S		¥1.5	S
9	700			~	Yt S				>	Yt. S		>	Yt S			005	Δ1											
01 C	8 0 0	-	YES								7	YES Y	Yt. S	YES	n	003	_	YES	×+ 5:			YES		YES Y	Yt S		7 £ S	3
0 10	004										¥	YESY	Yt S	Yt S	s	004	*					YES		>	Yf S		7.1 S	33
× 50	M 1 S				•	N IS	SIM			Σ	n E																	
01 Y			Ţ	103			J	COI NON	Š				Ž	NON	NON	z					S		Ž		Ç	CO1 NUN	ž	

_
\$
-
Š
-
_
Š
#
3

CEXPERIENCE MFFLECTS THAT ON-	IF YOUR EXPERIENCE MFFLELTS THAT ON-LINE, INTERACTIVE PROCHAMMING
EFFECTIVE TOUL WHA! BO YOU FE!	WAS AN EFFECTIVE TOUL WHAT DO YOU FEEL INC. IMPROVEMENT IN PRICKAMMEN
PRODUCTIVITY DVER CONVENTIONAL (BATCH) SOFIMARE DEVELOPMENT MASS	1) SUFIMARE DEVELOPMENT MASS
A. NUI AN IMPROVEMENT	
1.5:1 IMPROVEMENT	
211 IMPRIVINENT	
311 IMPREVEMENT	
SII IMPRIVEMENI	
Y. DID NOT USE UN-LINE, INTERACTIVE PRUGRAMMING/UNKNUMN	PRUGRAMMING/UNKNUWN
41.11.15.41	

PART/SUB		MESPUNDUM 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 125 124 125 126 127 128 129 150	400K	104	105	106	101	108	601	110	Ξ	112	113	114	115	100	111	20	119	1 02	1 12	1 77	25.1	24 1	77 52	\$ 1 S	7 12	8 12°	1 1 50	
6	Ð				YES		YE S											Yt S		_	Yt S									
5	Ç											YES	YES YES													YES	'n		YES	
0	a							YE S	YES YES																					
9 10	w																							=	STA					
× 10	×	S X	so.											S I S		N N			•	SIM			I	N S			z Z	S H S		
V 10		NON	NON	NON NON		3				NON	NON NON				N O N		NON	-	Z		Z	NON NON	Š		ž	NO.				
PART/SUB		HESPUNDUR 201 202 203 204 205 206 207 208 209	15UR	1 204	205	206	207	20E	209		711	212	213	214	215	216	210 211 212 213 214 215 215 217 218 219 220 221 222 223 224 215 216 217 218 229 250	218	2 613	2 02,	7 17	2 22	2 52	7 77	45 26	\$6 \$2	1 22	8 225	052	21
10	<											٠							-	Y E.S										
01 8	2											003							YES		-	rt s				YE S	'n			
0 I C	u																-	Y I S		>-	x		₹	YES	YES	'n			YES	
0 1 0		YES		YE S							YES																			
6	u												YES																	
6	×	Ī	MIS MIS			NIS	MIS MIS MIS	N S																						
6	>				00				103	S				NON NON	Š		NO.					Ž	200	ž	Z S Z		C 0 1	COI NUN	_	
6	~															H														

UUK 3 T 1 UN 15 B	158	EMALL, NAGENS NAGENS LIABLE, EXTRE VENY LUDD FAIR	HUM MELL MAJUK GUA KEMENI UF MAINIAIN MELY WELL MELL	DO YOU ALSI TO THE SY TABLE, A	THINK THA DELIVER STEM, WHE ND USABLE	HOW WELL DO YOU INION THAT THIS PROJECT MET THE FROJECT MAJOR GOALST TO DELIVER ON TIME, WITHIN BUDGET, AND METTING NEMENT OF THE SYSTEM, WHERE THE FINAL SUFTWARE PRODUCT IS MAINTAINABLE, AND USABLE? MELY WELL	TOTECT METALL SOF	ET THE BUDGET, THAKE P	PRUJICI AND MED KUDUCI	7 N S S S S S S S S S S S S S S S S S S				
		t. PUOR F. FAILED Z. OTHER												
PAR1/SUB	HESPUNDUR 101 102 103 104 105 106 107 108	106 107 108	104 110	111 111	113 114	184 118 111 111 111 111 111 111 111 111	117 118	119 120	21 121 1	1 521 2	54 155	120 127	621 821	150
V 10	YES		YES		71.5	YE S		YES	rt S		YŁ S		7£ 5	
9 10	YES YES	YES YES		¥£8	YES YES		YES YES	YES				YES	YES	
01 C	YŁ.S			Yt S		YES			Yt S			YES		
0 10			YŁ S											Yt S
01 E		YES									YES			
01 F	AF S	YES					YES							
× 10										SIN				'
PART/SUB	KESPONDOR 201 202 203 204 205	205 206 207 208	209 210	211 219	. 213 214	209 216 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230	217 218	219 22(251 55	2 223 2	54 552	226 227	528 822	0521
4	YES	YŁ.S		YES		YES YES YES			x + s	or)				
9 10	16.5	YES	YES	YE S	YES		YES YES YES	YES					¥ .	NS YES
01 C	YES		YE S						Yt S		YES	YE S		
0 10								YES	:0	>	YE S			
0.1 E												Yt S	7 t 3	
01 F	۲ks									YES				
X 10	R18	SIX												

GIVE SOME LESSONS LEAKNED FROM THIS PROJECT

UUE ST 1 UN 159

PAK	PAK1/SUB	HE SP 101	MESPUNDUM 101 102 103 104 105 106 107 108	. F	701	1 50	90	07 1		1 50	101	- :	11 71	1 5 1	-	11 51	1 0	1	- -	4 120	171	122	123	109 1110 111 112 115 114 115 116 117 118 119 120 121 122 124 125 126 127 128 129	1 571	46 1	27 1.	124	1 50	_
6	001	<u>.</u>	HIS MIS MIS PSC	113	+ STF	H 35,	N S	RIC MIS		01C H	2 2 3	0 01H	O4A M	N SIN	N SIN	NIS NIS	HSS S1	H PIA	A K10	S M S	964 9	3 E	768	85B	P St 066		P 3F K SC	SIM D	A18 0	_
6	700				•	PSU	x	712	0	01C x	X1E X	XIE O	048				4 . 4	⋖	KIE						HW J	¥	K9D U6B	ŋ	x 11	
0	003				<i>31</i>	I n	3	Pat	3	250							P18	3	91 H	ي							H7+	_	CMA	
5	0 0 4						_	780									FIC	J									CMA	₹.	CMA	
0	900						3.	P1k									C.1 A	⋖											L44	_
6	01 006																												4 1 4	-
PAKI	PAR [/SUB	HE 3P	NE SPUNDOR 201 202 203 204 205 206 207 208	203	7 702	5 50	7 90	2 10		2 602	210 211	11 2	212 21	213	214 2	15 21	215 216 217	7 21	8 214	4 220	- 221	575	22.5	422 822 122 922 422 822 822 222 122 022 412 812	2 425	7 97	77 17	52.83	, 250	_
-	100 10	P9H MIS	H I S	1 21,	2 S I S	176 0	¥ 6	PIC MIS UTE U9A MIS MIS		CSF P	F1E K	KID MIS		CMA U	USEM	364 SIM	3E C1E	t PSC	C MIS	S H IS	SIM	C.1	X C	MIS CIE R9B D3B MIS CSE	3 S E		N S C	CIH HIY	K I A	_
0	700 10	164	•	P.10	J	0.7F D	D46		×	3 96x	CKGP	P5C					0.5£	t 995	يد.			(1)		a1.3		ר אנ	ĩ	PBH CMC	C C MA	-
0	01 003		~	×1£						XIE	7 002	P50						×	×			cst		£11	3	ពរព	Ĵ	CMA P3L	CMC	
0	004		•	781					U	CMA	1	P 5G						CMC	Û			983					'n	szu xit	6 I A	
01	900								7	¥14								R 1B	20			บรถ					0.38	<u></u>	**	15
0	900								J	010												0.54					š	L 9 0	210	_
0 1	007								ب	113												450					8.2A	₹.		
5	900 10								<u>a</u>	P SH																	ā	USA		
0.1	500								×	x 7.8)I)	ی		
6	010								×	116 x																	U513	Ð		
0	110 10																										P 5C	ړ		

	1 50	900	665	005	700	000	100				2 50	003	700	100	005	900	004	
	129	900	500	100	400	00	700				229	004	100	700	000	000	700	
	128	900	200	001	500	900	000				228	003	700	100	500	900	000	
	127	900	900	100	004	200	900				227	900	900	100	000	003	200	
	92	500	700	700	900	003	100				526 ,	200	100	5 0 0	900	700	500	
	1.25	005	003 (001	900	700	700				225	005 (700	100	900	500	700	
	124 1	700	0 200	100	0 500	900	1 500				2.84.5	004) 500	003 (900	700	100	
	125 1	•	•	•	9	3	•	C 0 2			2 5 2 2	003 0	0 400	0 200	900	0.05	0 100	
	1 771	100	200	\$ 0 n	900	500	004	ن			7 777	0 000	0 5 00	0 700	0 900	0 600	100	
x = 1		0 6 1 0	0 100	0 1 00	0 700	0 700	0 700				2 172	n 900	0 400	0 500	0 400	0 700	0 100	
F IN ORDER P	120 121	0 5 00	0 04 0	0 500	0 900	0 200	0 100				7 077	0 8 00	002 0	0 100	0 500	0 900	0 400	
	511	0 100	0040	00 2 00	0 SIH	SIN	0 8 00				219 2	0 5 00	0 700	0 100	0 900	0 04 0	0 500	
	118	005 00	003 00	004 00	H 990	0.05 M	0 100				218 2	003 0	004 0	0 100	0 900	0 700	0 500	
SPACE	11 / 11	003 00				005 00	004 00				217 21	00 \$ 00	004 00		0 400	00 700	0 500	
ECT THE		9	005	100	900	3	0		~					100 7			S 0(
LELOWING ORJECTIVES OF A PROJECT LENTER NUMBER 1 THROUGH 6 IN THE LEU IN BUDGE! THE BOLE THE	5 116								C 0 2	so.	5 216	\$ 004	5 00 5	700 5	S M 9	S MIS	SIMI	
	4 115	4	₩	_	4	Š	3			S I	4 215	6 00 5	5 002	2 004	900 6	\$ 005	1001	
OLLOWING OBJECTIVES OF A CENTER NUMBER 1 THROUGH JULD IN BUDGE! THE BULE QUINEMENTS TAINABLE ABLE INCENTIVE (SON CONTRACT INCENTIVE (WITH JOB (ADDED)	3 114	200 S	4 003	1 001	900 9	\$ 005	2 004				3 214	900 7	\$ 005	1 002	5 004	\$ 00 9	2 001	
INCE	2 11 5	2 005	9 00 4	1001	b 006	> 005	4 002				2 213	# 00 #	5 00 5	1 00 1	\$ 002	\$ 006	2 00 2	
3 486 K	711 1	5 00 Z	00	2 001	900 #	\$ 005	700				1 212	F 004	\$ 005	1001	900 9	5 00 5	4 002	
ING OBJECTI R NUMBER 1 IDGET LE MENIS MENIS BRE ONTHACT ING JOB (ADDED)	Ξ	900	900 9	005	1 004	1 00 5	100				211	\$ 00 S	2 00 5	100	900	900 0	1004	
FULLUWING OBJECTIVES CENTER NUMBER 1 THRE BOULD HIN BUDGE! SCHEDULE EQUINEMENTS INTERNET TABLE T	110	900 9	000	005	000	003	1001				210	00	700	001	900	002	004	
	501	003	200	001	900	900	004				506		_		_		~	I
77.25	108	900	004	001	500	00	200 700				20B	900	700	001	00	700	00	
PLACE IN PROJECT AN BA BE B B. BE B C. BE B E. BE B C. DEPE B. VARI	101	003	000	001	000	900 000	000				707	900 900	004 004	005	900	100	003	
7 - g < a o o o o o o o o o o o o o o o o o o	106	003	900	001	900	000	005				206	900	00	100	005	900	700	
	105	006 005 001 006 006 005 003	900	000	003	700	003 004 001 002				205	900	900	003	004	700	004 004 004 001 005 003	
	104	900	900	100	200	003	004				204	002 005	100 100 100	005	900 500	100	004	
	103	001	700	905	900	900	003				₽ 203	₹00	100	003	900	900	004	
	UND 102	500	003	200	900	004	001				ONDC 202	003		700	900	500	004	
9	HESPONDOK 101 102 103 104 105 106 107	900	900	000	000	003	100				MESPONDOH 201 202 203 204 205 206 20 <i>1</i> 20	500	003	100	900	900	004	
					_				_				_		_			-
KO 1 1 0 3 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1	PARI/3UB	4 10	10	0 C	0 10	01 E	1 10	9	=	0 x	PAKT/3UH	٥.	H 10	3 10	0 1 0	0 E	01 6	× =
3	₽ A										7							

101	
201	
duk S	

11 IS KEPONTED IN LITERATURE THAIS I SUPPORT LIBRARIAN, PLUS 2 PRUGRAMMERS, OU YOU BELIEVE THIS? A. YES B. NO C. DO NOT KNOW, INSUFFICIENT DATA/FYPERIENCE (ADDED)

NO DO NOT KNOW, INSUFFICIENI DATAZEXPERIENCE (ADDED) UTHER

3 104	-	01 50	101 9	1 6 8	1 601	10 111	71	113 1		5 116	1117	118 11	0 ~ 1 ~ 0	171	1 771	25 16	125	126	127 128	MESPUNDIN 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130
YES YES YES	YES	YES	ve s		, 	YES YES		YES Y	YŁS					¥ t s	_	503	YES			
YES YES YES					vt s		C 0 3			C 0 5	YES	COS YES YES YES YES	s Yts		s T			Yt S	, 1 °	TES YES YES
																		J	C 0 2	
									£	on.						S I K	S			
MESPUNDUR 201 202 203 204 205 206 207 208 209	.05 206 207 208 209	b 207 208 209	508 508	5	~	10 211	212	215 2	14 219	5 216	217	18 21	9 220	221	5 772	25.22	4 225	3.922	822 12B	210 211 212 213 214 215 214 217 218 219 220 221 222 224 225 226 215 216 217 228 229
YES CO3 YES	ES CO3 YES	3 YES				Yt s		=	YŁS			¥	YES YES		YES	YŁ	YES YES YES	YES	YES	
YES YES					ū	C 0 3	YES	YES	YES	ø		Yt s			~	YES			YES	
C02	C03	203	203								C 0 5			C 0 2						
SIT										N S										SIN SIN

218	8
-----	---

C 4 6 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	3	IF YOU BELIEVE	THE SUPPURT	LIBHAKIAN D	OES MELIEV	YOU BELIEVE THE SUPPOHI LIBHARIAN BOES HELIEVE THE PROGRAMMEN	:			
		11 HA110 11 HA110 1 10 1 3 10 1 4 10 1 5 10 1 10 10 VAH1ES	YSI UF UNNFCESSAY IASKS, BUT DU NI HAILO DU YUU CUNSIUER MURE ACCURA I 10 1	TASKS, BUT DO NUT BELLIDER MORE ACCURATE? TO SKILL LEVEL (ADDED) NUT KNOM (ADDED)	11.8 11.8 12.8 ADDE (0.)	UNNECESSARY TASKS, BUT BU NOT BELIEVE THE RATIO IS 2 TO DO YOU CONSIDER MORE ACCURALE? DO YOU CONSIDER MORE ACCURALE? ACCURDING TO SKILL LEVEL (ADDED) HELIEVE/DU NOT KNOM (ADDED)	2 2 0			
		Y. HELIEVE 2 2. OTHER	2 10 1							
PANT/9UB	NESPONDOH 101 102 103 104 105 106 107 10	5 10c 107 10s 109	110 111 115	311 111 115	116 117 1	18 119 120 12	1 122 125	124 125 126	8 109 110 111 112 115 114 115 116 117 118 119 120 121 122 124 125 126 127 128 129 130	1 50
۷				Yt S						
0 10	YES			YES	YES YES	SS T				
J 10		YES YES						# S	ø	
0 10	ves ves	s YES								
01 6	C02									
1 10	C02				C 0 2		C 0 2		C 0 3	
9 10			rt 5			€03			503	
× 10				S X				SIE	n E	
, to		100	100 100			33	103	100		107
7 10						01н	# 5			
PAR1/SUB	HESPUNDOR 201 202 203 204 205 206 207 208 209 210 211 212	5 206 207 208 209	210 211 212	213 214 215	2 115 217 2	18 219 220 24	17 555 17	1 224 225 22	213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 250	250
0 1 A								Yt S		
9 10									4. S	
) IO	Y ES							71.8	n	
010	YE	YES YES	Yt S	rt s		res				
9 10			C02							
9 10	C02	C03			503	د	707			
x 10		SIM		SIE	S I W		8 I H	ø	S I	SIN SIN
A 10	NUN COI	107	103	C01		103 103	107	100	100	

2	7	a
4	-	₽

					. ± .	<u> </u>		G HANDS		SUN		2 2	ية پ	PERSONNEL TO THE PHOJECT	-														
							03 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	601 1 A TE		SCHEDULE SCHEDULE	로 로 - - 나 나	ΞΞ	SCHEDULE MITH CUSTOMER SCHEDULE MITH MANAGER	T X															
							NCE NO	PHO Y	S TO N	NOTHING TO TOP MANAGEMENT CE PHOJECTS GOALS (ADDED) IGN MANPOWEN (ADDED)	HAN!	NGE MI	Z G	<u> </u>	<u> </u>	A N	3	ວິສ	t ou	NUTHING TO TOP MANAGEMENT HOPING TO MAKE OF SCHEDULF TIME CE PHOJECTS GOALS (ADDED) IGN MANPOWER (ADDED)	Ĭ								
					- 0 * > 2	USE OF PLA		SE SE	VENTIME (AI IN THE PRUJE S. DEPENDS NG (ADDED)	DVENTIME (ADDED) AN THE PROJECT (ADDED) ES, DEPENDS ON SITUATI ING (ADDED)	11 IS	24 (U) 24 1 1 (3	NVEHTIME (ADDED) IN THE PROJECT (ADDED) S. DEPENDS ON SITUATION (ADDED) NG (ADDED)	2														
PART/SUB	NESPONDUM 101 102 103 104 105 106 107 108	00R 103	1 04 1	501	90	107	_	*0	9	=	3		14 1	15.1	91	7	20	2	02	1 17	77	53	71 5	08 45 45 75 45 45 45 45 45	121	128	129	1 \$0	
V 10																						,	rt S						
9 6	YES			_	YES	rt s			YES YES	es S	-	YES YES	ş		-	YES YES	7E.S			YES Y	X S	Ξ	TES TES	STES		Yes		00	
O 1 0			YE S	_	YES		3	C 0 2				-	Yt. S					THS YES YES	is 1	r S -	× 11 &	Ξ	YES	YES	s vt s	C 0 3	CO3 YES OUZ	700	
0 10			7 £ 3	_	YE S											YES						7	7 t S	¥ ;	res res		CO 5 001	100	
01 6						YE S																						_	2
9 10						200																							219
						_	YES																						
1 10			J	C 0 2																J	707					203			
١٥ ا		C 0 2				J	70 0			ن	C 0 2)	703		J	703										
4 10	C 0 2									3	C 0 2			ی	707						ٽ	C 0 2							
x 10													1	SIN															
2 10																									0.1				

WHAT ACTIONS ARE CUSTOMARILY TAREN BY THE PROJECT MANAGER WHEN IT IS DISCOVERED THAT A PROJECT IS BEHIND SCHEDULE?

A. WRING HANDS

B. ASSIGN MORE PERSONNEL TO THE PROJECT

C. RENEGOTIATE SCHEDULE WITH CUSTOMER

D. HENEGOTIATE SCHEDULE WITH MANAGER

QUE ST 10M 16 5

PANT/SUB	MESPUNDUR 201 202 203 204 205 206 207 208	4 205 2)~ 90	07 ZUE		210	209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 235 217 218 217 218 229 230	515 Z	5 51	14 21	> 216	417	418	617	220	, 177	5 77;	2 2	22 60	> 460	125 .	425	7 677	90
A 10	YES.			YES	29														100	_				
H 10	YES YES	rts	T.	res cas	**	YE S	¥ + 9			YF S	ø,	¥ 1 S		YF 3	YE S	YES YES YES	ກ :	7	YES 004	7			YES Y	1 t s
ن 10			=	TES CO	•	Yt s	YES		>	YES		YES		yt s		YE S		Ξ	YES 002	~			YES Y	11 S
0 10						41.5	YES YES	>	YES YES	SS .			YE S	YES YES			-	YES YES	s 00 s	~			YESY	YES
01 t																			005	•				
y 10	2 1 ×	¥	YE S					YES																
9 10																				C 0 2	•			
- 10				CO 2	~						C 0 2	. .									203	C02 C02		
7 10																•	ר מיק					203	J	707
0 X	C 0 2	Ģ		C 0 2	~																			
× 10					M S																			

PLEASE FUHNISH ANY ADDITIONAL CUMMENTS OR STATEMENTS CONCERNING. THIS SURVEY OR THE SCIENCE OF SOFTWARE ENGINEERING PROJECT MANAGEMENT UUE STIUN 164

	9 311	440000	3																											
PAHI/SUB		102	100	MESTURDIA 101 102 103 104 105 106 107 108	105	106	101	901	501	110	Ξ	111 1115 1113	113	7	114 115 116	2=	=	118	2	120	171	821 121 921 921 123 123 124 125 126 121 121 111	125	124	125	146	171	128	129	1 50
100 10		S I I	A 0.1	MIS MIS AOI MIS MIS AOS AO7 MIS	<u>n</u>	A 0 5	A07	S I	A 1 2	SIN	₹ 1	A 16	7	N E	N N	<u>x</u>		n H	AIB MIS MIS		MIS AZZ MIS	S	SIE	<u>S</u>	415	3 2	2		S I	S K
01 005	~		A 0 2	_		A 0 4	804 POA		A 1 S			114					7 4													
01 003	~					A 05	A05 A09		A 1 4								A 2 0													
01 004						A 0 6	A06 A10		A15								174													
500 10	•						114																							
PART/SUB		HE SPUNDUH 201 202 20	0¥ 205	MESPUNDUH 201 202 203 204 205 206 207 208	202	206	207	208	508	210	211	212	212 213		214 215 416 217 218 219 220 221 225 224 225 226 221	416	217	218	219	220	771	777	522	224	445	526	127	977	425	6 \$ 9
100 10		A 2 3	A 2 0	MIS A23 A20 A25 A26 MIS MIS MIS	A26	Z Z	N N	N S	E	E S	N N	T T	S I	E S	MIS MIS MIS MIS A27		S E	SIN	NIS MIS MIS MIS	S Z	37 X		MIS A25	A 25	9 H	N IS	S E	S E	S I	S E
01 002	^		A 2 4																											

SECTION 3

REFERENCE

INTRODUCTION

In preparing this survey, literally hundreds of books, articles, and papers were read. The results of this literature search became a general model of how software engineering project management was accomplished. This model is represented by the original question. ire (see Appendix B). It would be impractical in an informal report such as this to list all these publications, particularly since many of the ideas contributed were general across many different publications. However, where one document was the source of most of one question (or a group of questions) or a unique definition was used (i.e., structural programming, HIPO, chief programmer, Orthodox Job Enrichment, etc.) a reference is given. We hope nobody was slighted.

REFERENCES

AFR 300-15, Automated Data System Project Management, USAF, Washington, DC (16 Jan 1978)

ASPR, Armed Services Procurement Regulation, Section III, Part 4, "Type of Contracts," Dept of Defense (1976)

Baker, F. T., "Chief Programmer Team Management of Production Programming," IBM System Journal, Vol 11, Spring, (1972) pp 56-73

Black, Rachel K. E., BCS Software Production Data, BCS Report F30602-76-C-0174, (Prepared for Air Force Rome Air Development Center), Boeing Computer Services, Inc., Seattle (1977)

Boeing Computer Services, Inc., "Software Quality Assurance Guide," Prepared by BCS/SAMA Division Technical Staff, Document Nr BCS 40111 (Jun 1976)

Brooks, F. P., The Mythical Man-Month: Essays on Software Engineering," Addison-Wesley, Reading, MA (1975)

Computer Decision, Hayden Publishing Company, Rochelle, NJ (Jun 1977)

Dijkstra, E. W., Notes on Structure Programming, In O. J. Dahl, E. W. Dijkstra, and C. A. R. Hoare, Structured Programming, Academic Press, New York (1972) pp 155-165

DOD Manual 4120.17M, Automated Data System Documentation Manual, (Dec 1972)

Drucker, Peter F., The Practice of Management, Harper and Row, New York (1954)

Gilb, Tom, Software Metrics, Winthrop Publishers, Cambridge, MA (1977)

Hartwick, R. Dean, "Test Planning," <u>Proceedings</u>, 1977 National Computer Conference, AFIPS Press, Montvale, NJ (1977)

Herzberg, Frederick I., "Orthodox Job Enrichment: A Common Sense Approach to People at Work," <u>Defense Management Journal</u> (Apr 1977)

Heyel, Carl, The Encyclopedia of Management, Van Nostrand Reinhold Co., New York (1973)

IBM, "HIPO - A Design Aid and Document Technique," IBM Installation Manual, GC20-1851-1, IBM Corp (May 1975)

Ingrassia, F. S., "The Unit Development Folder (UDF): An Effective Management Tool for Software Development," TRW-SS-76-11, TRW, Inc. (Oct 1976)

Manley, John H., "Embedded Computers - Software Cost Considerations," Proceedings, 1974 National Computer Conference, AFIPS Press, Montvale, NJ (1974)

Maslow, A. H., "A Theory of Human Motivation," <u>Psychological Review</u> (1943)

Olsen, David G., "A Standardized Automatic Data Processing System Conversion Cost Program," A Research Study, Air University, Maxwell AFB, AL (May 1977)

Yourdon, Edward, How to Manage Structured Programming, Yourdon, Inc., New York (1976)

Weinberg, Gerald, <u>The Psychology of Computer Programming</u>, Van Nostrand Reinhold Co., New York (1971)

APPENDIX A

CONTRIBUTORS

INTRODUCTION

This appendix lists those individuals (usually project managers) and firms who completed the survey. This list is provided to: 1) acknowledge the contribution, hard work and willingness to contribute to the general knowledge of computer science by these individuals; and 2) to lend credibility to this report by making visible the excellent source of the data.

These people and companies are all members and supporters of the AIAA Technical Committee on Computer Systems.

At the end of this list is a group of individuals that wished to remain anonymous in order that they could provide more candid, truthful answers.

It was obvious from the answers received that the continubtors worked very hard making the answers as truthful as possible. Again, the authors thank you.

CONTRIBUTORS

Mr Philip S. Babel Technical Advisor for Computer Systems Acquisition

Mr Francis J. Barrett Chief, PEACE SIGMA Development Unit

Mr Frank L. Bernstein Vice President Federal Systems Division

Mr Herman S. Binder Section Head, Systems Design, Analysis & Integration Section

Dr M. Lenard Birns Program Manager, Naval Warfare Gaming System

Mr Jack E. Bloodworth Manager, ALCM Software

Mr David A. Brown Chief, ARRCS Development Group

Mr Allen G. Burgess Manager, Computer Systems Laboratory Simulator Systems Program Office Aeronautical Systems Division Wright-Patterson AFB OH 45433

Data Automation Branch Sacramento Air Logistics Center McClellan AFB CA 95652

CALCULON Corporation 1501 Wilson Boulevard Arlington VA 22209

Grumman Aerospace Corporation Bethpage NY 11714

Defense Systems Division Computer Sciences Corporation 304 West Route 38, Box N Moorestown NJ 08057

The Boeing Aerospace Company P.J. Box 3999
Seattle WA 98124

Data Automation Branch Sacramento Air Logistics Center McClellan AFB CA 95652

Equipment Division Raytheon Company 528 Boston Post Road Sudbury MA 01776 Mr George R. Cannon Jr.
Manager of Vandenberg Programs

Mr Frank J. Cerulli
Director of Engineering
Computer Systems Division
also
Products Systems Division

Mr James P. Chilton
Director, Data Processing Sub Systems
Systems Technology Program

Mr Arthur C. Ciccolo Associate Division Leader Computer Science Division

Mr James W. Clark Manager of Engineering Operations

Mr Jerry E. Cummings Program Analyst Logistics Research & Systems Division

Mr G. Russell Curtis Manager, Simulation & Data Systems Information Systems Programs

Mr Alan J. Deerfield Consulting Scientist

Mr Edward M. Dunaye Director, Quality Assurance

Mr Joe N. Dyer Manager, Equipment Evaluation & Systems Programming

Mr Richard R. Erkeneff Chief Design Engineer, Data Control & Processing Systems

Mr S. G. Evetts Project Manager

Dr George R. Fath Acting Manager Avionics Development Engineering Logicon, Incorporated P.O. Box 1567 Vandenberg AFB CA 93437

Lockheed Electronics Company, Incorporated U.S. Highway 22 Plainfield NJ 07061

McDonnell Douglas Astronautics Company 5301 Bolsa Avenue Huntington Beach CA 92647

The Charles Stark Draper Laboratories, Incorporated 555 Technology Square Cambridge MA 02139

United Technologies Research Center East Hartford CT 06108

Directorate of Plans & Programs Sacramento Air Logistics Center McClellan AFB CA 95652

General Electric Company 450 Persian Drive Sunnyvale CA 94086

Submarine Signal Division Raytheon Company P.O. Box 360 Portsmouth RI 02871

Planning Research Corporation 7600 Old Springhouse Road McLean VA 22101

Lockheed Missile & Space Company, Incorporated P.O. Box 504 Sunnyvale CA 94088

McDonnell Douglas Astronautics Company 5301 Bolsa Avenue Huntington Beach CA 92647

Vought Corporation P.O. Box 5907 Dallas TX 75222

General Electric Company 901 Broad Street Utica NY 13503 Mr Herb Finnie Manager, PLSS Software Development

Mr J. I. Freeman Avionics Project Engineering

Dr Virgil "Smokey" V. Griffith Chief, Electronics Engineer Digital Computer & Software Engineering

Mr Harvey I. Gold Manager, Software Technology Dept

Dr Kenneth A. Hales Manager, MSP Mission Control & Software

Mr Uwe W. Ibs Design Specialist

Dr Peter R. Kurzhals
Director, Guidance, Control &
Information Systems Division

Mr John C. Lemanczyk Manager, Software Technology Development

Mr Myron Lipow
Senior Staff Engineer, Product
Assurance
Systems Engineering & Integration
Division

Mr Austin Maher Manager, Software

Dr John H. Manley Assistant to the Director

Dr Robert R. McCready Applied Mathematician Lockheed Missile & Space Company, Incorporated P.O. Box 504 Sunnyvale CA 94088

Vought Corporation P.O. Box 5907 Dallas TX 75222

McDonnell Aircraft Company P.O. Box 516 St Louis MO 63166

System Development Corporation 2400 Colorado Santa Monica CA 90406

The Boeing Aerospace Company P.O. Box 3999 Seattle WA 98124

Pomona Division General Dynamics Corporation P.O. Box 2507 Pomona CA 91766

Headquarters National Aeronautics & Space Administration Washington DC 20546

Grumman Aerospace Corporation Bethpage NY 11714

Defense & Space Systems Group of TRW, Incorporated One Space Park Redondo Beach CA 90278

Kearfott Division The Singer Company Little Falls NJ 07424

Applied Physics Laboratory The Johns Hopkins University Johns Hopkins Road Laurel MD 20810

Vought Corporation P.O. Box 5907 Dallas TX 75222 Mr H. Lewis Parker Manager, Mini/Micro Based Systems Dept

Dr Leon Pressor President

Dr Terry A. Straeter Head, Programming Technologies Branch

Mr Herbert D. Strong, Jr. Manager, ADP Management Office Flight Projects Support Office

Mr R. L. Van Tilburg Senior Scientist Computer Programming Laboratory

Mr Gene F. Walters Manager, Software Technologies Information Systems Program

Mr Lynn S. Wilson Director, West Coast Operations

Mr Eric W. Wolf Manager, Washington Operations

Anonymous Technical Advisor for Computers

Anonymous
Manager, Communication Anlysis

Anonymous Chief, Scientific Applications Analysis Branch

Anonymous Tech Director, Simulation Division

Anonymous Senior Engineering Specialist Avionics Software COMSTAT Laboratories 22300 Comstat Drive Clarksburg MD 20734

Softool Corporation 340 S. Kellogg Avenue Goleta CA 93017

Langley Research Center National Aeronautics & Chace Administration Hampton VA 23665

Jet Propulsion Laboratory California Institute of Technology 4800 Oak Grove Drive Pasadena CA 91103

Hughes Aircraft Company P.O. Box 3360 Fullerton CA 92634

General Electric Company 450 Persian Drive Sunnyvale CA 94086

Grumman Data Systems Corporation 16133 Ventura Blvd, Suite 675 Encino CA 91436

Bolt Beranek & Newman, Incorporated 1701 No Fort Myer Drive Arlington VA 22209

Engineering & Development Organization Large Government Agency (Military)

Electronic Systems
Large Manufacturing Company

Research Center Large Government Agency (Non-Military)

Software and Engineering Large Manufacturing Company

Aircraft Development Large Aerospace Corporation

APPENDIX B QUESTIONNAIRE

INTRODUCTION

This appendix contains Part Two of the questionnaire, plus Questions 1 through 4 and 25 of Part Three (renumbered Questions 160 through 164 of Part Two). Other reports will contain the balance of the question-naire.

The questionnaire, as printed in this report is a modified version of the questionnaire as originally answered. This was done for the following reasons:

- (1) Not all questions had accompanying multiple choice answers but were narrative in nature,
- (2) The original questionnaire contains space for project managers to add their own comments as answers to the questions rather than select one of the pre-given answers, and
- (3) There were errors (typo and otherwise) in the original survey which needed correcting.

The procedures used to report on those questions that did not have preselected answers was to modify the original questionnaire to make it "look like" the authors had preselected these possible answers and the participants had checked them. In truth, the answer set was derived from the submitted answers. To indicate which questions were originally narrative in form, a notation in parenthesis following the question will indicate "originally narrative."

In addition, the original questionnaire contained space for project managers to add their own comments as answers to the questions rather than select one of the pre-given answers. This was encouraged by the authors in order to insure that the answers to the questionnaire were as accurate as possible and not distorted by forcing the participant to only select from our pre-conceived answers. Again, to provide structure so the answers can be encoded in a computer data base system, the "comment" answers were grouped and the possible "answer set" expanded to include these answers. To indicate these additional answers the word "added" will be placed in parenthesis at the end of the question.

In contrast, Questions 33, 51, 52, 67, 68, 90, 115, 127, 159, and 164 were left in narrative form. This was done because of the extreme number of different answers that were submitted. These questions were very open-ended questions pertaining to "lessons learned" and "research needed," and were extremely varied and opinionated. These questions are answered by encoding the variety of answers and entering this code on the tabulation sheets.

Other modifications were made to the original questionnaire where the participants indicated the question was poorly worded or where the participants modified the original question by the insertion of a word or phrase. The auriors inserted these in the interest of making this version of the questionnaire more complete. These additions to the original questions and/or original answers are indicated by placing the added portion in brackets "[]" and placing the word "added" in parenthesis at the end of the question or answer.

Where typographical errors were made, the questionnaire was corrected. The corrected word was contained in brackets "[]" and the word "corr" placed in parenthtesis at the end of the question or answer.

The authors hope that the above explanations do not appear to be too complex. They were done purely in the interest of conveying the maximum amount of information to the reader about the original questions and the possible answers presented to the respondent. The questionnaire follows.

After the questionnaire was sent out, it was discovered that there were two Questions 68. This was corrected by having the second Question 68 renumbered 69f.

References were added where they were needed or where the addition of a reference would make the question clearer. An abbreviated source is contained in brackets "[]" and the complete source follows this appendix.

RULES AND CONDITIONS FOR PARTICIPATING IN SURVEY

It is important that no company, or individual suffer any loss of proprietary information or receive unfavorable publicity as a result of this survey. Each individual participating in the survey has our full assurance that the data he provides will be treated in accordance with the above principles. In order to achieve this we stipulate the following:

- 1. Unless specifically authorized, the names of participating firms, or individuals will not be listed in the report as contributors.
- 2. The anonymity of the company, department, individual, and project will be preserved in every instance.
- 3. Any proprietary or company confidential information, if so identified (by writing "CONF" beside the question) will be protected and used only in deriving statistical data.
- 4. The individual completing the questionnaire can omit the answer to any question without invalidating the questionnaire.
- 5. Only if cleared for further dissemination will raw data (completed forms) be made available to the participating AIAA TC members, should such request be made, to assist them in research work of their own. Without exception, all company, department, project, and individual names, as well as responses identified as "CONF" will be systematically deleted prior to release.
- 6. If so requested by the submitter, only statistical data will be derived from the survey, and the survey form destroyed upon publication of the final report.

Though it is seen as providing benefits to all participants, including the U.S. Air Force, this survey is not sponsored by the U.S. Air Force, or any individual, group, committee, or company, and does not imply any obligation on the part of the participants. It is being accomplished solely to provide data to be presented at the AIAA Conference, Computers in Aerospace, 31 Oct - 2 Nov 1977, Los Angeles, California.

RICHARD H. THAYER

OHN H ZEHMA

MEMO OF UNDERSTANDING

A SURVEY OF MANAGEMENT TECHNIQUES AND PROCEDURES

EMPLOYED IN SOFTWARE DEVELOPMENT PROJECTS

INSTRUCTIONS

Each survey packet comprises three parts. The number of packets provided will, in most cases, match the number of projects to be reported on plus one spare. If more forms are required you may copy or call.

PART ONE of the survey deals with defining the total organization and the overall management structure, requirements, and philosophy, and is intended to be answered by top management. It provides the backdrop against which the individual projects are to be viewed. Normally, only one copy of PART ONE should be completed per mailing, but each packet contains PARTS ONE, TWO, and THREE for the sake of uniformity and the chance that, in some instances, additional PART ONES would be called for.

A PART TWO is to be completed for each project reported on, and is intended to be completed by the <u>project manager</u>. (It is assumed the project is completed or almost completed) If those methods now often referred to as Modern Programmer Productivity Techniques (top down design, structured programming, et al.) are being used in whole, or in part, in your development activities, you should consider selecting a representative sample of before and after projects in completing the survey.

PART THREE consists of general questions not related to any specific project, and is also intended to be completed by a project manager. One PART THREE is included in each packet on the assumption that each project will be reported on by a different project manager. If one manager reports on more than one project, he or she would only complete PART THREE one time.

The dynamic nature and infinite diversity of the entire field of Data Processing has kept the jargon from becoming universally defined. For this reason we have attempted to avoid terms that might have more than one meaning. If questions appear vague or imprecise, feel free to call for clarification. Or, if you prefer, rewrite the question to ask what you believe the point to have been, or to relate it to your particular environment.

The answers provided for each question are not the universal set of possible responses, so, if you believe selecting one of the canned replies would be misleading please select "other" or "comment" and explain. If more space is required, write in the margins indicating the number of the question being answered. If a question defies

answering either through complexity, non-relevance to your environment, or excessive research feel free to leave it blank or enter an appropriate comment. If you write "CONF" in the left margin adjacent to any question, that response will be treated as confidential/proprietary data as described under "Rules and Conditions..", attachment 1 to the basic letter.

If possible, avoid direct reference to specific firms, projects, and people. Each set of questionnaires has been pumbered in order that we might keep related responses together and facilitate accounting. Base numbers have been selected at random and no algorithym has been employed that would facilitate pairing firms with forms.

We very much appreciate the time and effort you're putting into this. Your time, effort, and candor are essential to the success of our joint effort.

Please return the completed surveys in the return envelope provided or mail to:

Colonel Richard H. Thayer SM-ALC/ACD McClellan AFB, CA 95652

A SURVEY OF MANAGEMENT TECHNIQUES AND PROCEDURES EMPLOYED IN SOFTWARE DEVELOPMENT PROJECTS

PART TWO (Modified)

SECTION 1 - PROJECT IDENTIFICATION

INTRODUCTION. PART TWO of this survey pertains to the management of \boldsymbol{a}

answered	individual, software development project and is intended by the <u>Project Manager</u> . It is assumed that the project be on is complete or almost complete.	
THE IDENT	IFICATION NUMBER ASSIGNED THIS FORM IS	<u> </u>
Please re	turn completed form in envelope provided or mail to:	
	Colonel Richard H. Thayer SM-ALC/ACD McClellan AFB, CA 95652	
	<pre>was/is your position in relation to the project you are on? (Originally narrative)</pre>	
a.	Project manager	[;
b.	Software project manager	i
c.	Project manager's supervisor (Program manager)	[]
d.	Technical director or Technical advisor	[]
e.	Project individual	[]
f.	Corporate officer	[j
g.	Customer	[]
z.	Other:	[;
PROGRAM I	DENTIFICATION	
	hat applications/functional area(s) did this [software] all? (added)	
а.	Commercial/business, such as inventory control, payroll, accounting and finance, etc.	[]
ь.	Data acquisition/retrieval	[]
с.	Scientific, such as engineering calculations, data reductions, etc.	[]
d.	Simulation or modeling applications	[]
e.	Process control to include embedded computer systems [Manley, 1974]	[]
f.	Command and control systems	l i
g.	Management information systems	[j

	h.	Communication systems, message switching	
	i.	Computer systems, such as software monitors, compilers, operating systems and other system, software	
	z.	Others:	
3.	The	project was:	
	a.	A new software development	
	ъ.	A continuation of a previously completed software development	
	с.	A major modification of an existing software system	
	z.	Other;	
4.	If t	he project was a major modification did it involve:	
	a.	Transferring existing software to a different computer	
	ъ.	Rewriting application software	
	c.	Writing a new operating system	
	у.	Project was not a major modification to an existing system	
	z.	Other:	
5.	The	software product was designed for:	
	a.	Commercial off-the-shelf computer hardware	
	ь.	Commercial off-the-shelf operating system	
	c.	Modified commercial off-the-shelf computer hardware (added)	
	d.	Modified commercial off-the-shelf operating system	
	e.	Special purpose computer [hardware] system (added)	
	f.	Special purpose operating system	
	z.	Other:	
COM	MERCIA	AL HARDWARE IDENTIFICATION	
	nputer	the software system was being developed for commercial and hardware, was selection and delivery of the commercial part of the overall project? (added)	
	a.	Yes	
	b.	No	
	c.	No, furnished by user (added)	
	у.	System was not developed for commercial off-the-shelf computer hardware	
	z.	Comment:	

	off-the-shelf [computer] hardware was used, in what mode tion did the production system run? (added)
a.	Batch
b.	Remote batch/remote job entry terminal (RJET)
c.	Interactive processing [real time] (added)
d.	Transaction processing
e.	Stand alone
у.	System was not developed for commercial, off-the-shelf computer hardware
z.	Other:
	the target (production) computer for this software ty was an off-the-shelf commercial system:
a.	Give manufacturer, make, and model
b.	Give operating system employed
у.	Host computer was not a commercial computer
z.	Comment:
	the host (development) computer for this software ty was an off-the-shelf commercial system:
a.	Give manufacturer, make and model
٥.	Give operating system employed
у.	Host computer was not a commercial computer
z.	Comment:
SPECIAL	PURPOSE HARDWARE IDENTIFICATION
	the software system was developed for special purpose hard- s the hardware development part of the overall project?
a.	Yes
b .	No
у.	System was not developed for special purpose hardware
z.	Comment:
	the software system was developed for special purpose what type was this?
а.	Embedded central processor
ъ.	Special terminals such as those employed in command and control and airborne systems, etc.
с.	Special systems such as radar sensors, or process

	у.	System was not developed for special purpose hardware
	z.	Other:
		host (development) commercial hardware system was used ping this special purpose capability:
	a.	Give manufacturer, make, and model
	b.	Give operating system employed
	c.	System was developed on special purpose computer
	у.	System was not developed for special purpose hardware (added)
	z.	Comment:
CUSTO	MER	IDENTIFICATION
		customer or user was: [Taken partly from <u>Computer</u> Subscription Application form, Jun 1977 Issue]
	a.	In-house to my company or major division
	Ъ.	Within my parent organization
	с.	A manufacturer of computer hardware
	d.	A manufacturer of other than computer hardware
	e.	A "software house"
	f.	An engineering service and technical support organization
	g.	The Government: federal (non-military), federal (military), state, county, municipal
	h.	A university or educational institution
	i.	A computer service bureau, time-sharing service bureau
	j.	An ADP consultant and/or education service
	k.	Financial: banking, insurance, real estate, securities, credit
	1.	In the wholesale or retail trade
	m.	In medical or legal services
	n.	In transportation services
	0.	Utilities: communications, electric, gas
	р.	Foreign government (added)
	z.	Other:
L4. users	_	the customer purchasing the software system for other
	a.	Yes
	ь.	No
	z.	Comment:

15. Are	(is) there:
a.	Multiple users of the system
b.	Only one user [one or more locations] (added)
z.	Comment:
CONTRACT	IDENTIFICATION
l6. Und	er which of the following contract types or agreements was ware system developed? [AFPR, 1976]
a.	Firm fixed price
b.	Fixed price with economic price adjustment
c.	Fixed price incentive
d.	Firm fixed price level of effort
e.	Cost
£.	Cost sharing
g.	Cost plus incentive fee
h.	Cost plus award fee
i.	Cost plus fixed fee
j.	Time and materials .
k.	Labor-hour
1.	Basic ordering agreement
у.	No contract was used (added)
z.	Other:
	the contract had an incentive clause [for software], what incentive based on? (added)
a.	Reduced [or meets] cost (added)
ъ.	Early [or meets] delivery (added)
c.	Increased performance (explain how it was measured)
у.	Contract did not have an incentive clause
z.	Other:
4.	

20.This p	project began (first assignment) in	
SOFTWARE	IDENTIFICATION	
	what language was this data system programmed? If more language was used please indicate appropriate percent-	
a.	FORTRAN	
ь.	JOVIAL _	
с.	COBOL	
d.	Assembler [(unspecified)] (added)	
e.	CMS-2 (added)	
f.	PL/1 (added)	
g.	Higher order language [(unspecified)] (added)	
z.	Other:	
22. In written?	cotal, approximately how many lines of source code were	
a.	Executable	
ъ.	Comments:	
c.	Other non-executable	
COMPLEXI	TY IDENTIFICATION	
complexi	ng Table 1 on the following page please estimate the ty of the data system (from 12 to 60). All descriptions to software only. The complexity rating:	
DAMA BACI	E IDENTIFICATION	
DATA BASI		

(ACTONS	,	,	1	•	٩
) ORIGINALITY REGUIRED	MOME-REPROCERAM ON DIFFERENT EQUIPMENT	MINIMUM MORE STRINGENT REQUIREMENTS	LIMITEG-MORE ENVINON MENT NEW INTERFACES	CONSULTABLE APPLY EXISTING STATE OF ANT TO ENVIRONMENT	EXTENSIVE REQUIRES AD VANCE IN STATE OF THE ART
ALITAU BOTHE OL S COLUMN S COL	HIGHLY RESTRICTED SIMILE PURPORE	RESTRICTED PARAMETER LED FOR A RANGE OF CAPACITIES	LIMITED FLEKIBILITY. ALLOWS SOME CHANGE IN FORMAT	MULTI PUNPOSE FLESI- BLE PORMAT RANGE OF SUBJECTS	VERY FLEXIBLE ABLE TO HANGLE A BROAD BANGL OF SUBJECT MATTER ON DIFFER ENT EQUIPMENT
3 SPAN OF OPERATION	10CA 08 UTLITY	COMPONENT COMMAND	SINGLE COMMAND	MIL TI-COMMAND	LEFENSE CRPANTMENT World wide
* CHANGE IN SCOPE AND OBJECTIVE) HOOM	IN DOCUMENT	UCCASIONAL	FREQUENT	CONTINUO:
AANETAMOD ENBMAINDE Q	SINGLE MACHINE ROUTINE PROCESSING	SINGLE MACHINE ROUTINE PROCESSING EXTENDED PRIPHERAL SYSTEM	MULTICOMPUTER STANDARD PERIPHERAL SYSTEM	MULTI-COMPUTER AD- VANCED PHOLBAMMING COMPLEX PERIPHERAL SYSTEM	MASTER CONTROL SYSTEM MULTI-COMPUTER AUTO INPUT/OUTFUT AND DISPLAY EQUIPMENT
4 PERSONNEL ASSIGNED	-	1.	815	F1 -61	IS AND OVER
) DEVELOPMENTAL COST	** -1	101-41	50- 200K	200 140K	OVEN 300 K
8. CRITICALITY	DATA PROCESSING	ROUTINE OPERATIONS	PERSONNEL SAFETY	UNIT SURVIVAL	MATIONAL DEFENSE
D. AVERAGE REPONSE TIME TO PROGRAM CHANGES	2 OR MORE WERKS	1-2 WELKS	3-7 DAYS	1-3 DAY\$	1-24 HOURS
IS AVERAGE REPONSE TIME TO DATA INPUTS	2 OR MORE WEEKS	1-2 WEEKS	1-7 DAVS	1-24 HOURS	0-46 MINUTES
11 PROGRAMMING LANGUAGES	HIGH LEVEL LAMBUAGE	HIGH LEVEL AND LIMITED Absembly Language	HIGH LEVEL AND EX- TERSIVE ASSEMBLY LANGUAGE	ABSEMBLY LANGUAGE	MACHINE LANGUAGE
12 COMCURRENT SOFTWARE DEVELOPMENT	NOME	LIMITED	MODERATE	EXTENSIVE	EXHAUSTIVE

TABLE 1 - Level of Project Complexity

SECTION 2 - REQUIREMENT SPECIFICATIONS, INPUT CONDITIONS, AND ENVIRONMENT

REQUIREMENT SPECIFICATIONS

25.	Who p	prepared the requirement specifications?
	a.	The customer
	b.	An organization affiliated with the customer, but not the customer himself
	c.	Your organization, e.g., a two-step procurement, an unsolicited proposal, etc.
	d.	An outside consulting firm
	e.	A third contractor, e.g., an integrating contractor
	у.	None prepared (added)
	z.	Other:
26. lid t	-	our organization prepared the requirement specifications ustomer participate?
	a.	Yes
	b.	No [customer did not participate] (added)
	c.	No, customer was source (added)
	у.	Not applicable, your organization did not prepare specifications (added)
	z.	Comment:
f therel:	ne sy imina Was	scale of 1 to 7, with 1 being little more than the <u>name</u> stem, and 7 being complete specifications down through ry <u>design</u> , how detailed were the specifications provided? it necessary to rewrite the specifications before g with design?
	a.	Yes (specify percent rewritten)
	b.	No [specifications were adequate] (added)
	c.	Yes, however specifications never rewritten (added)
	d.	Yes, rewritten concurrent with design (added)
	у.	Not applicable, requirement specifications were never written (added)
	z.	Comment:
29. the		t was necessary to rewrite the specifications, what was on? (originally narrative)
	a.	Errors in specification

•	b.	Specifications were ambiguous, incomplete, and/or inconsistent	ĺ
	с.	Change in scope of project	į
	d.	Change in requirements of project	[
	e.	Change in hardware design	. [
	f.	Normal way of doing business	(
	g.	Customer and/or developer became better informed	į
	у.	Was not necessary to rewrite specifications or requirement specifications were not prepared	Ċ
	z.	Other:	į
30.	The	specifications were prepared:	
	a.	Using top-down (Hierarchy of Function) techniques	(
	b.	Using structured design/flow techniques	ĺ
	c.	In phases, with design and coding started before the requirement specification was completed	[
	d.	In a formal requirement language (describe)	[
	e.	In such a manner as to facilitate tracking the development of software from requirements through coding and tie each delivered software module to some part of the requirements (approximately	(
	ť.	In precise, measureable terms to aid in development of acceptance testing (approximately $\frac{\chi}{2}$ of the requirements could be measured).	ĺ
	g.	According to MIL-STDs (added)	ĺ
	у.	Specification never prepared/none (added)	ĺ
	z.	Comment:	[
DOCL	MENTA	TION REQUIRED BY THE CONTRACT/CUSTOMER	
	soft he pr	following is a list of documentation that may be required ware development contract. Check each document required oject and add required documentation not contained in the OOD Manual 4120.17M, (Dec 1972)]	
	a.	Object Listing/Deck/Tape	[
	ь.	Source Listing/Deck/Tape	[
	с.	Functional description—initial definition of a project which provides the ultimate user with a clear statement of the operational capabilities to be developed (also sometimes called requirements specifications).	[

d.	user group is required to generate and maintain system files.	[•
e.	System/subsystem specificationprepared for system personnel, as detailed as possible, concerning the environment and design elements, in order to provide maximum guidance to the program design effort; also defines system subsystem interfaces.	[}
f.	Program specificationsprepared for programmers; contains considerable detail for the purpose of guiding program development.	[i
g.	Data base specification—prepared for programmers in sufficient detail to permit program coding and data base generation by the programming group.	[]
h.	Users Manual—to present general and specific information on how a specific computer program will be used [(includes positional handbook for remote input terminals)]. (added)	[ì
i.	Computer Operations Manual—contains precise detailed information on the control, requirements and operating procedures necessary to successfully initiate, run, and terminate the subject system.	ĺ	1
j.	Program Maintenance Manual contains general and specific information for computer personnel responsible for the maintenance of the computer programs.	ί	1
k.	Test and Implementation Plancontains an orderly schedule of events and lists of material necessary to affect testing and delivery of a complete data processing system.	[]
1.	Test Analyst Report—describes the status of the computer program system after test and provides a presentation of deficiencies for review by staff and management personnel.	[]
m.	Software development plan (added)	[ì
n.	Software standards and requirements (added)	[]
ο.	Management reports (added)	[}
p.	Interface control (added)	ĺ	j
q.	Budget (added)	[]
r.	Progress Reports (added)	[]
s.	Error/discrepancy report (added)	ĺ]
t.	Program change requests/status (added)	[1
u.	Version description (added)	[i
v.	Software product/output specifications (added)	[

	Ζ.	Other:
SPEC	IFIC	CUSTOMER REQUIREMENTS
32.	Whic	h of the following were specified by the customer?
	a.	A specific computer (this was
	b.	Storage limitations (these limitations were
	c.	Speed constraints (explain
	d.	A specific language (this language was
	e.	His participation in the design function
	f.	His participation in the coding function
	g.	Prioritized requirements
	h.	Development under life-cycle costing concepts
	i.	Development under design-to-cost concepts
	j.	Development under modern programming techniques
	k.	Portability
	1.	Human engineering
	m.	Security
	n.	Safety
	٥.	MIS-S-52779
	р.	Modified MIL-S-52799 (how modified)
	q.	Types of review
	r.	Frequency of review
	s.	Input data
	t.	Output requirements
	u.	Test plan/procedure
	v.	A particular reliability figure to attain (if so, what method of measuring software reliability did the customer specify?)
	w.	A maintainability goal to attain (if so, what method of measuring software maintainability did the customer specify?)
	y.	Customer did not specify (added)
	z.	Comment:

bb. Customer training cc. A warranty of the software for a period of time (give time in calendar months) ENERAL 3. If you could affect the method by which requirements were pecified, or were able to initiate research into improving the
ENERAL 3. If you could affect the method by which requirements were
3. If you could affect the method by which requirements were
· · · · · · · · · · · · · · · · · · ·
equirements specification function, what action would you take?

SECTION 3 - PLANNING

PLANNING AND SCHEDULING

37.									
		lid the planning bef individual for accom			was assigned to a				
	a.	A [permanent] plann (added)	ing grou	p set u	p for this purpose				
	b.	An ad hoc planning	group (a	dded)					
	c.	A steering committe schedules	e which	establi	shed costs and				
	d.	An on-going project	(added)						
	e.	Program manager was planning	picked,	and he	edid the initial				
	f.	A staff function							
	у.	No planning accompl	ished (a	dded)					
	z.	Other:							
35.	In p.	planning for this project did/was:							
	a.	The project manager use a formal planning guide?							
	b.	The customer active function?	ly parti	cipate	in the planning				
	c.	A work breakdown st the software develo levels)	pment?	(approx					
	d.				phases for the purpose				
	у.	None (added)							
	z.	Comment:		,					
36									
36.	What	tools were used in	planning	the pr	oject?				
36.	What a.	tools were used in PERT	planning []	the pr	oject? Milestone (added)				
36.				•	_				
36.	а.	PERT		f.	Milestone (added)				
36.	a. b.	PERT Modified PERT	[]	f.	Milestone (added) CSCS (added)				

b.	Estimates based on a	1 8	simi	lar projec	et .	ĺ	ì
c.	Provided by somebody correctly	/ V	vho	had a knad	ck for estimating	ί	i
d.	Bottom-up aggregatin	ıg	(ad	ded)		[}
e.	Cost and/or schedule	e 1	vere	dictated	(added)	[j
f.	Simulation model					[]
g.	Crystal ball (or sim	nil	ar	means)		[]
у.	Cost and schedule no	t	est	imated (ad	ided)	[]
z.	Other:					[]
If the sed we have the sed with		ar S	nd/o or	r other es variables	stimating technique; considered? (added)		
a.	Computer time	[]	n.	Number of modules (sub routines)	[]
b.	Documentation	[]	0.	Lines of code (added)	ſ	J
c.	Training	[]	0.	bines of code (added)	i	j
d.	Travel	[1	р.	Size of program (added)	[]
e.	Site preparation/ construction	[]	q.	Requirement specific-action completeness (adda		1
f.	Ratio manage- ment & overhead to programmers	[1	r.	Customer support (added)	[]
_	<i>V</i>	r	1	s.	Historical data (added)	[]
g. h.	Keypunch Office supplies	[]	t.	Availability of support software (added)	[·]
i.	Office space	[]	u.	Calendar period (added)	[]
j.	Personnel equip- ment, i.e., desks, pencils, paper, etc.	٠]	٧.	Size of data base (added)	[1
k.	Programmer profic- iency	[1	₩.	Experience (newness) with system (added)	[]
1	December 1 and 500 f	r	1	у.	Not used	ĺ	Ì
1.	Program complexity/ function	ι	1	z.	Other:	Į]
m.	Tester proficiency	[]				

de	etermine	d and submitted for	vare devel review by	opmen:	plan and schedule were or management and/or		
cı	stomer		لدرسو مستطم			,	
	a.	The delivery data s		-	•		}
	b.	The delivery data s					j
	c.	The delivery data I]
	d.	The delivery date	-	•]
	e.	The delivery data of	- •				1
	f.	The requirements of		match	schedule (added)		1
	g.	Resources reduced ((added)				;
	у.	No change (added)					j
	z.	Comment:				[ļ
40 fo		he process of softwa planning documents			lopment which of the		
	a.	Project management	[]	k.	Data conversion	ĺ	1
	Ъ.	Resource require- ments	[]	1.	Change control		j
	c.	Organization	[]	m.	Configuration manage- ment (added)	ί]
	d.	Staffing	[]	n.	Review & reporting	ί	1
	e.	Training	[]	ο.	Product assurance (added)	ί	1
	f.	Test	[]	р.	Work Breakdown Structure	ŗ	ı
	g.	Software develop- ment	[]	γ.	(added)	ι	1
		D		q.	Budget (added)	[j
	h.	Phase and/or delivery	[]	у.	None	{	1
	i.	Documentation	[]	z.	Other:	[]
	j.	Implementation	[]				
	ystem, a	project inception to pproximately what pe in planning for sol	ercent of		of the completed ime was spent by all		
wi	iat perc				ivities, approximately the of the following?		
	а.	Organizational plan	nning				
	b.	Staff planning					_;
	c.	Developing Control	procedure	s			%

	d.	Administration planning	
	e.	Quality assurance planning	
	f.	Developing an overall project management plan	/0
	g.	Design standards (added)	16
	h.	Test planning (added)	7/ /s
	i.	Document and configuration management planning (added)	7/3
	у.	None (added)	i l
	z .	Other:	[]
43.	The s	system was:	
	a.	Delivered to the user as an entity	[]
	ъ.	Delivered to the user in phased increments	[]
	z.	Other:	[]
44. codi		every major software module designed in total before any s started?	
	a.	Yes	[]
	b.	No (percent of design completed when coding started	[]
	z.	COMMENT:	[]
QUAL	ITY A	SSURANCE (QA) PROGRAM PLAN	
45.	A QA	program was:	
	a.	Applied informally	[]
	ь.	Applied formally and documented separately	[]
	c.	Applied formally and documented as part of the project management plan	[,
	у.	Not applicable to [or used on] this project (added)	[]
	z.	Comment:	[]
stan	mente dards	hich of the following areas were formal [and/or] d QA standards applied and were these company-wide or standards developed specifically for this project? Boeing, 1976]	
			<u>B</u>
			al to ject
	a.	Documentation []]
	b.	Work breakdown structure (WBS) code []]
	c.	Scheduling []	1

			<u>~</u>	<u> </u>	
			Company-Wide Standards	Local to)
		-		Project	-
	d.	Performance measurement	[]	[]	
	e.	Requirement analysis	[]	[]	
	f.	Preliminary design	[]	[]	
	8.	Detail design	[]	[]	
	h.	Coding	[]	[]	
	i.	Test planning	[]	[]	
	j.	Software verification	[]	[]	
	k.	Reviews and audits	[]	[]	
	1.	Configuration management	[]	[]	
	m.	Discrepancy reporting and correction	on []	[]	
	n.	Software acceptance	[]	[]	
	у.	No formal [or documented] QA standards (added)	[]	[]	
	z.	Other:	_ []	[]	
47. used		n of the "modern programmer practice ne software development project?	es" given below v	~ere	
	a.	Program manager authority—both ted administrative responsibility for a			[]
	ь.	Reviews—formal milestone reviews a phase [Black, 1977]	it the end of eac	eir	[]
	с.	Unit development folderscapture of for each identified item to facility ment, testing, documentation [Ingra	tate end item dev		[]
	d.	Design discipline and verification- formal design representation, compl and deliberate verification of desi [Black, 1977]	letion of design	,	[]
	e.	Program modularitydefinitions/resinterfaces between modules, adherer relationships between modules. [B]	nce to parent/ch.		
	f.	Naming conventionsstructured name data items [Black, 1977]	es for modules a	nd/or	1
	g.	Structured formsuse of Dijkstra in your programming language [1972]		ible	[]
	h.	Structured walkthroughsdeliberate code for each module [Weinberg, 197	•	f	[]

1.	requirements [Yourdon, 1976]	Į	1
j.	Structured designbuilding system from small, highly independent, single purpose modules [Yourdon, 1976]	[]
k	. Chief programmer teamsa development organization around a programmer of great ability [Baker, 1972]	[]
1	. HIPOa documentation technique [IBM, 1975]	[]
m	Support libraries and facilitiesuse of automated or proceduralized design, coding and configuration manage- ment acceptance testing [Black, 1977]	[]
n	Phased testing—defined and formalized unit, functional, and acceptance testing. [Black, 1977]	[]
0	Configuration management/change control—creation and control of baselines and procedures for problem reporting and resolution. [Black, 1977]	ĺ]
у	. None of the above (added)	[]
z	. Other:	[]
each andeterm	t? If a single document covered more than one area, check rea accounted for. The intent of this question is to ine which areas were covered by documentation not the actual nt form. [See Section 2 for definitions]		
а	. Functional description	{]
b	. Data requirements document	[]
С	. System/subsystem specification	[]
d	. Program specifications	[]
e	. Data base specifications	[]
f	. Users manual	[]
g	. Computer operations manual	[1
h	. Program maintenance manual	[1
i	. Test analyst report	[]
j	. Test plans (added)	[]
k	. Interface control (added)	[j
1	. Training course (added)	l]
m	. Version description (added)	Į	ŀ
n	. Software development plan (added)	[]
у	. None (added)	ĺ	}
z	. Other:	ſ	1

49. proj		n software tools/aids were selected for use on this		
	a.	Structured pre-compilers	[l
	b.	Automatic flowcharters	[]
	c.	Library monitors	ĺ	i
	d.	Macro programming capabilities	[١
	e.	On-line capabilities	[į
	f.	On-line dubugging	[j
	g.	Automatic test case generators	[ļ
	h.	Simulators or drivers (added)	[
	i.	Batch debugging aids (added)	ĺ	į
	j.	Standards auditors (added)	{	,
	у.	No software tools/aids employed	[i
	z .	Other:	[i
50. this		h test tools/techniques/methods were selected for use on ect? [Hartwick, 1977]		
	а.	Comparatorsused to compare the code of one program version to that of another for coding errors	l	j
	b.	Editorsanalyze source code	[1
	c.	Flowchartingshow the logic structure of a program	{	
	d.	Logic/Equation generators—translates assembly language programs into a machine—independent microprogramming language and builds the microprogramming statements into networks to analyze the flow of control and reconstruct arithmetic statements	[
	e.	Program structure analyzers—analyze program paths under input control	[ļ
	f.	Correctness Proofsestablishes that a given program performs a desired function and halts	[
	g.	Symbolic Program Executionsdecompose source code by logically executing it	[
	h.	Initialization Tests—the performance of all initialization operations is tested to assure that all indicated initialization operations are performed and that correct values of all initialized quantities result	{	
	i.	Interaction Testall quantities, variables, and system conditions obtained from other modules are examined to determine the sensitivity of the module under test to their possible values or states	[

j.	Arithmetic Testthe precision of arithmetic calculations is checked to discover where insufficient precision is attained or incorrect arithmetic calculations are performed	[]
k.	Timing Analysis—the longest and shortest possible execution times for all tests are determined to establish the execution time requirements for the module and to identify potential timing problems	[]
1.	Branch Logic Test—the correct branching decision paths for each branch and each closed—loop test case are checked. The branch decision paths that are not exercised in any of the normal test cases are identified and their correctness demonstrated by special test cases	(}
m.	Comparison of system output with manual output the system will replace (added)	ĺ	j
n.	Real world simulation (added)	[]
у.	None (added)	(1
z.	Other:	[1
organizat	you had total control of the planning function within your tion, or were able to initiate research into how to improve ning function, what actions would you take?		
52. If s	It were in your power to make changes in the way technical		
decisions	It were in your power to make changes in the way technical sare made concerning programming techniques, test procedures ation standards, etc., what action would you take?	s,	

SECTION 4 - ORGANIZATION

DEFINITIONS [Heyel, 1973]

Line Organization—A line organization has a direct line of responsibility and control from the chief executive or general manager to intermediate line executives, to foreman and supervisors, to workers. A line or operating organizational unit is one that is actually doing the work that represents the primary mission of the larger organizational unit. Examples are aircraft manufacturing, radar construction and installation, supply and transportation of spare parts, building and launching a MARS lander, teaching in a university, etc.

Staff Organization—A staff organization is given responsibility and authority over special activities, such as inspection, employment, purchasing, legal, engineering, automatic data processing (ADP), etc. A staff or service organizational unit is any unit which is helping the line do its work, but is only responsible for the special activity not the final product of the larger organizational unit.

Matrix Organization—A matrix organization is built around specific projects. A manager is given the authority, responsibility, and accountability for completion of the project. The line or staff organizations provide qualified personnel when needed, who return to their parent organization when their task is done. The project manager usually does not have authority or responsibility to hire, discharge, train, or promote personnel. This is the responsibility of the line or staff manager.

Project Organization—A project organization is similar to a matrix organization except that the personnel are permanently assigned to the organization. The manager is also given the authority, responsibility and accountability for completion of the project. However, the manager must meet his goals within the resources of his organization. The manager usually has responsibility to hire, discharge, train, and promote personnel within his project organization.

PREORGANIZATIONAL FUNCTION

53.	To	which	organi	lzation	within	the	firm	was	this	software
devel	Lopi	nent p	roject	first	assigned	1:				

z.	Other:	[]
d.	A staff organization outside the authority of the senior ADP manager [or no senior ADP manager] (added)	[}
c.	A staff organization under the authority of the senior ADP manager $% \left(1\right) =\left\{ 1\right\} =\left\{ 1\right\} $	[]
b.	A line organization outside the authority of the senior ADP manager [or no senior ADP manager] (added)	l	1
а.	ADP manager	{	ļ

init	ial b	h organization was responsible for determining the udget, delivery schedule, resource requirements, computer ity, etc., [for software]? (added)	
	a	The organization to which the project was initially assigned	
	b.	A line organization under the authority of the senior ADP manager	
	c.	A line organization outside the authority of the senior ADP manager [or no senior ADP manager] (added)	
	d.	A staff organization under the authority of the senior ADP manager	
	e.	A staff organization outside the authority of the senior ADP manager [or no senior ADP manager] (added)	
	z.	Other:	
When	this	project was <u>initially</u> assigned:	
	a.	The ultimate proje: manager participates in determining the schedule, budget figures, etc.	
	Ъ.	The planning, budgeting, and allocation of resources was done by a special staff established for this function. (give name)	
	c.	An ad hoc group was set up to handle the initial assignment until a permanent group was established	
	z.	Comment:	
PROJ.	ECT M	ANAGEMENT ORGANIZATION	
56. deve		hich organization was the [software] project assigned for nt? (added)	
	a.	The organization to which the project was <u>initially</u> assigned	
	ь.	The organization responsible for determining initial budget, schedule, etc.	
	c.	A line organization under the authority of the senior ADP manager	
	d.	A line organization outside the authority of the senior ADP manager [or no senior ADP manager] (added)	
	e.	A staff organization under the authority of the senior \ensuremath{ADP} manager	
	f.	A staff organization outside the authority of the senior ADP manager [or no senior ADP manager] (added)	
	z.	Other:	

		software development was organized under [the following ypes]: (added)	
	a.	A project organization	[
	ь.	A matrix organization	ĺ
	c.	A project manager with administrative authority while the actual development work was done by line and staff organizations	ŗ
	у.	Not organized under a project [type] organization (added)	ί
58.	In t	his project:	
	a.	Software development was handled within the ADP environment with functional analysts or prospective users being assigned or attached to the development team	i
	ъ.	ADP specialists were detailed or assigned to the functional user for the duration of the development effort	[
	c.	The functional user employed "analysts" who developed specifications, designs, algorithms, etc., which were then presented to the software development team for implementation	l
	d.	The ADP function was done by the functional analyst/user (i.e., ADP was not a separate function) (added)	ί
	e.	The functional analysis was done by the ADP personnel (i.e., there was not a separate user analysis) (added)	í
	у.	None of the above (added)	į
	z.	Other:	[
SOFT		ENGINEERING PROJECT TEAM	
59. proj		many positions [(filled and unfilled)] supported the (added)	
head atio	led by on wit	the [software] project organization divided into teams each a technical leader? Note: In a small project organizath diverse activities it would be possible to have one-eams. (added)	
	a.	Yes	[
	b.	No	{
	z.	Comment:	ĺ
	or the	th types of teams were employed in software development purpose of this question an engineer is considered an (added)	
	a.	Combined [functional] analysts-programmer team (added)	[
	ъ.	Separate software [functional] analysis team (added)	[

	c.	Separate programmer team
	d.	Separate test team
	e.	Separate integration team
	f.	Separate interface team
	g.	Separate product acceptance team (added)
	у.	Did not employ teams
	z.	Other:
62. mana		h of the following functions were internal to the project t organization?
	a.	Administration
	b.	Project control
	c.	Program support librarian
	d.	Product/quality assurance (added)
	e.	Configuration management (added)
	у.	No functions of this type were integral in the project management organization
	z.	Others:
63.	To w	hom did the rest team report?
	a.	The project manager
	b.	Other than project manager (added)
	у.	Did not employ a [separate] test team (added)
	z.	Other:
64.	:ow	many individual teams were assigned to the project?
65.	The	teams were organized under:
	a.	A chief programmer [Baker, 1972]
	b.	A lead programmer (a senior experienced programmer)
	c.	Task leader/work leader/project leader (added)
	d.	Lead engineer/systems engineer/analyst (added)
	у.	Did not use teams
	z.	Others:

a.	Chief programmer
b.	Back-up programmer
с.	Program support librarian
d.	Surgeon
e.	Administrator
f.	Editor
g.	Co-Pilot
h.	Programming clerk
i.	Tool smith
j.	Tester
k.	Language lawyer
1.	Software architect
m.	Software engineer (added)
n.	Technical director (added)
у.	None of the above (added)
z.	Other:
	ch of the many forms of project organization do you feel tes the most to the success of the project?
	you had it within your power to make one change in the way ect was organized, what action would you take, or if you ha

SECTION 5 - STAFFING

PROJECT MANAGER

69.	wnat	was the source of the project manager:	
	a.	New hire from another company	[.
	b.	New hire from school	()
	c.	Transfer from another project	[]
	d.	Transfer from within company other than project	[;
	e.	Promoted from within project (added)	Ι.
	ť.	The project manager was appointed or selected for this project by	[j
	у.	Did not have a project manager (added)	. [,
	z.	Other:	[]
70. the		many years experience did the project manager have in wing areas?	
	a.	Functional area of project	Yrs
	b.	Data processing	Yrs
	.у.	No experience [no project manager] (added)	[]
	z.	Comment:	,

71. How many <u>years</u> of prior experience did the project manager have in the following areas and capacities?

		$\overline{\gamma}$	<u>B</u>	<u>C</u>	D	
		و الم				
	Capacity		Ting.	1 10	7,37	
	Area	<u>Yrs</u>	Yr <u>s</u>	Yrs	Yrs	
a.	Commercial/Business					
b.	Scientific					
c.	Simulation					
d.	Process control (to include embedded computer systems)					
e.	Command and control					
f.	Mgt information system					
g.	System software					
h.	Real time applications					
i.	Data communications					
j.	Computer operations					
у.	No experience/no project manager (added)					
z.	Other:					

72. In which programming languages and at what level of proficiency could the project manager program?

			<u>H</u>	<u>LGH</u>	AVERAGE	<u>1.01/.</u>
	a.	FORTRAN	[1	[]	[]
	b.	JOVIAL	[1	[]	[]
	c.	COBOL	[1	[]	[]
	d.	Assembler [(unspecified)] (added)	[]	[]	[]
	e.	CMS-2 (added)	[]	[]	[]
	f.	PL/l (added)	[]	[]	[]
	g.	HOL [(unspecified)] (added)	[j		
	у.	None/no project manager (added)	ĺ]	[]	[]
	z.	Other:	[]	[]	[]
73. was		age of project manager at the years.	be	ginn.	ing of the project	-
		the project manager ever a Ch 1972]?	ief	Prog	grammer (As define	⊇ú
	a.	Yes				[]
	b.	No				[]
	у.	No project manager (added)				[]
	z.	Comment:				[]
75. area		the project manager receive t or to (or early in) the proje				llowing
	a.	Functional area of project				[]
	b.	General data processing				[]
	c.	Modern programming technique	s			[]
	d.	Project management				[]
	e.	General management				[]
	f.	Programming languages (give	lan	guag	e) []
	у.	None/no project manager (add	ed)			[]
	z.	Other project related area				[]
76.	High	est education level attained	by	the	project manager wa	ıs:
	a.	Less than high school				[]
	b.	High school				[]
	c.	AA degree or two years of co	lle	ge		[]

d.	Between 2 and 4 years of	0	ollege	2		[
e.	BS/BA degree					[]
f.	Masters degree					[]
g.	Master degree plus 30 ho	ur	sor	doctoral	candidate	[}
h.	PHD (or equivalent)					[]
у.	Did not have a project m	ana	iger ((added)		[]
z.	Other:					[1
	ne project manager attend y was:	ed	colle	ege, his	major or		
a.	Computer Science	ĺ	1	ť.	Business	ί	i
b.	Mathmatics	[]	g.	Liberal Arts	[j
c.	Engineering	[]	у.	Did not attend/ no project	[1
d.	Physics (added)	[]		manager (added)		
e.	General Science (added)	[]	z.	Other:	1	į

THE SOFTWARE DEVELOPMENT STAFF

78. List the number of positions authorized by category over the life of the project, and list next to that the actual number of individuals who occupied these positions (e.g., if one project manager position was designated, but during the course of the project that position was occupied by three individuals at different times the answer would be: [1] [3]).

	De et et eu	<u>A</u>	<u>B</u>
	Position	Authorized	Occupied by
a.	Project manager	[]	[]
b.	Asst project manager (added)	[]	[]
c.	<pre>Functional analyst/[engineer] (added)</pre>	[]	[]
d.	Data processing analyst		[]
e.	Programmer	[]	[]
f.	Support librarian	[]	[]
g.	Secretary	[]	[]
h.	Administrator	[]	[]
i.	User/Customer (if part of the development team)	[]	[]
у.	None (added)	[]	[]
z.	Other:	_ []	[]

79. staf.		was the source (by percent) of the programmer/analyst	
	a.	New hire from another company	*,
	b.	New hire from school	- 7
	c.	Transfer from another project	**
	d.	Transfer from other than another project	
	e.	ADP staff (added)	*
	f.	Subcontractor (added)	•,
	z.	Other:	[}
80.	At w	hat level was the programmer support librarian?	
	a.	Clerk/programmer technician	[]
	b.	Junior programmer	[]
	c.	Senior programmer	[]
	у.	Did not use programming support librarian	[]
	z.	Other:	[]
81.	The	chief programmers were:	
	a.	Senior programmers	[]
	b.	Functional area experts .	[j
	c.	Specially trained for task	[]
	у.	Did not use chief programmers	[]
	z.	Other:	_ []
82. perc	What ent)?	was the education level of the programmer/analyst (by	
	a.	Less than high school	
	b .	High school	
	c.	AA degree or two years of college	
	d.	Between 2 and 4 years of college	
	e.	BS/BA degree	<u> </u>
	f.	Masters degree	
	g.	Masters degree plus 30 hours or Doctorate candidate	
	h.	PHD (or equivalent)	<u>%</u>
	z.	Other:	%
_	inall	percent of the programmer/analyst staff were y computer operators who moved directly from machine to programming?	*) (3

		these former operators make successful programmers?						
	a.	Yes, excellent	[]					
	b.	Yes, good/average	[]					
	c.	Yes, fair	[]					
	d. No, poor							
	у.	Did not use ex-operators as programmers	[]					
	z.	Comment:	[]					
STAFF	SUPI	PORT						
manag compa	ement	the following services provided from within the project t resources, or supplied by a staff function within the (Indicate by inserting "W" for within the project resources utside the project resources, ["B" for both]) (added)	s,					
	a.	Personnel f. Training						
	b.	Accounting g. Typing						
	c.	Budgeting y. None (added)						
	d.	Computer Operation z. Other:	_					
	e.	Travel Arrangement						
TRAIN	ING							
		the project manager responsible for identifying training nt of the development team members?						
·	a.	Yes	[]					
	b.	No	[]					
	у.	There was no training requirement or no project manager (added)	[]					
	z.	Other:	[]					
were for m	sati: etho	ning requirements generated as a result of the project sfied from which of the following sources? (Insert Ods/sources not employed and rank order the remaining ources with 1 being the most important.)						
	a.	On the job training						
	b.	Classes conducted by project team members						
	c.	Classes conducted by company cadre						
	d.	Classes conducted by the system user						
	e.	Classes conducted by independent training consultants						

f. Classes conducted by hardware/software vendors	
g. Classes conducted by colleges/universities	
y. None (added)	
z. Other:	
88. What percent of the personnel assigned to the project received additional training in the programming language selected?	
89. What percent of the personnel assigned to the project required additional training on the operating system that was used?	/3
GENERAL	
90. If it were within your power to make any changes, or initiate any research in the area of staffing, what would you consider the most fruitful area for modification or study?	
	-

SECTION 6 - CONTROL

PROJECT CONTROL

							
91. used		th of the following auproject control?	ıcoma	ted or man	nual systems were		
	а.	PERT	[]	g.	Graphs/Rate Charts (added)	[]
	b.	Modified PERT	[]	h.	Workloading	[]
	c.	[CPM] (corr)	[]	i.	Milestone tracking	[1
	d.	GANTT Charts .	[]	у.	No project control	[]
	e.	CSCS (added)	[]	z.	Other:	[1
	f.	WBS (added)	[]			 *	
92. syst		a work breakdown stru evelopment?	ıctur	e code use	ed in the control of		
	a.	Yes			•	ί]
	b.	No				(]
	z.	Comment:				[;
mon i and	itorin how h	th manual reporting page and management? A high did they go? How, or edited as they	t wha w oft	t level d en were t	id they originate, hey aggregated,		
COIL		i, or dariou as they		<u>A</u>	<u>B</u>	<u>c</u>	
		REPORT TITLE		LOWEST	HIGHEST OR RECIPIENT	NO. OF	
	а.	Weekly/monthly Activity					
	ъ.	Project Status					
	с.	Significant Chg					
	d.	Cost vs Performance (added)					
	e.						
	f.						
	у.	None/Unknown (added)				
	z .	Other:					

 $94.\$ Which automated reporting systems were used in project monitoring and management?

			$\underline{\Lambda}$	<u> 3</u>
			LOWEST ORIGINATOR	HIGHEST RECIPIENT
	а.	Manhour by Activity (e.g., code, flow diagram, etc.)		
	b.	Manday by Task (e.g., prepare users guide, design data base, etc.)		
	c.	None/Unknown		
	z.	Other:	·	
95.	In m	onitoring system development,	system software was	used to;
	a.	Count compiles per module		[]
	b.	Count lines of code produced		[]
	c.	Check for adherence to coding	g conventions	[]
	d.	Check for use of standard date	a element namès	[]
	e.	Perform manhour/cost account:	ing (added)	[]
	f.	Check performance (added)		[]
	g.	Monitor changes (added)		[]
	у.	Did not use software to monit	or system developmen	t []
	z .	Other:		[]
task	rs, s	productivity indexes such as ources of errors, turn arounds., that were employed in monitly narrative)	s required per comple coring performance.	ted
	a.	Lines of code (per unit of t	ime)	[]
	b.	Modules compiled (per unit of	f time)	[]
	c.	Program errors		[]
	d.	Computer time used		
	e.	Documented pages		[]
	у.	Did not use productivity inde	exes	[]
	z.	Other:		[]

97. Specific standards employed during the course of the project were developed, adapted, or directed by:

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
	C	Project	(l'arm	Was
	Standard	Manager	Company	User	None
a.	Data names	[]	[]	[]	: i
b.	Coding	[]	[]	[]	()
с.	Programming	[]	[]	[]	[[]
d.	Documentation	[]	[]	[]	i l
e.	Testing	[]		[]	· · ·
f.	Management report	[]	[]	[]	[]
g.	Configuration control (added)	1 []	[]	[]	[]
'n.	Quality assurance (added)	[]	[]	[]	[]
у.	No standards (added)	[]	[]	[]	[]
Ζ.	Other:	[]	[]	[]	[]
	ch of the following wer lopment effort? [AFR]			phases in	
a.	System definition				[]
þ.	Requirements definit:	ion			[]
с.	Preliminary design (a	added)			[]
d.	Detail design (added))			[]
e.	System design				[]
f.	Module design				[]
g.	Coding				[]
h.	Module test				[]
i.	Subsystem .cegration	n			[]
j.	System integration				[]
k.	System test				[]
1.	Acceptance (added)				[]
m.	Validation (added)				[]
n.	Operation				[]
0.	Maintenance (added)				
у.	Development was not (added)	divided into	o [recognized]	phases	
z.	Other:				[]

ASSIGNMENT OF WORK

99. Task assignment.

						Zu.	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	S		3/ V	``` }			
	Frequency Action		3.412/	,		\$/ 	1.7094	Y :	\$5. \$5./ \$1.	<u> </u>	7.7.7.5	hor.	1.	1//
a.	Were task assignments to the project teams given in writing?	[]	[]	[I	[].	[]	[]
ъ.	Were required completion dates included with each written team task assignment?	[]	[]	[]	[]	[]	[]
c.	Were written team task assignments prepared in such a way that the relationship of the task to the next higher level task was clearly delineated?]	ĺ]	[]	[1	į]	[]
d.	Were task assignments given to individual team members in writing?	[]	[]	[]	ĺ	}	[]	[]
e.	Were required completion dates included with each individual team member's written task assignment?	[1	[]	[]	[]	[]	(]
f.	Were individual team members written task assignments prepared in such a way that the relationship of the task to the next higher level task was clearly delineated?	[]	[]	[]	[]	[]	i	[]
у.	No Team (added)												[]
z.	Comment:										_		[]

assignmen	task work time estimates provided at the time of task t or did individual team members provide time estimates iewing this assignment?		
a.	Time and task assigned	į	i
b.	Time and task assigned with verification or modification of time allotted being provided by individual team member as a matter of procedure	į	į
c.	Individual team member provided the time estimate for each task assigned	[j
у.	No effort was made to determine time requirements for individual tasks	í	;
z.	Other:	:	i
101. At w	hat intervals were task assignments made to individual ers?		
a.	Every 5 work days	Į	i
Ъ.	Every 10 work days	ŗ	ì
с.	Every month	ĺ]
d.	As tasks were developed and defined	ĺ]
e.	As resources became available to work on the task	r	;
у.	Task assignment not made to individual team members (added)	[]
z.	Other:	[]
specific	procedures used in which programmers or analysts bid on tasks in the development projects (e.g., "I'll write the ram for \$1,217.12")?		
a.	Yes	[
ъ.	No	ĺ]
z.	Comment:	[1
103. If b was it?	idding as described above was employed, how successful		
a.	Very	[1
b.	Moderately	(}
с.	Unsuccessful	[1
у.	Not employed	[]
z .	Useful only under the following condition(s)	[1

FORMAL	REV	IEWS
--------	-----	-------------

c.

		formal reviews were conducted software development effort.	300-15,
a.	Systems i	cequirements review	
Ъ.	Systems o	iesign review	

Preliminary design review

d. Critical design review [] e. Formal qualifications review []

[] i]

No formal reviews were conducted { } у.

Other: [;

105.

NC	ERNING REVIEWS											_	\$ /
	Frequency			s/	. S.		14.00.			They Willy		1 de Rose	
	Action Was formal documentation provided in advance of each review?	{]	[!	1	i	[i	[)	l	:
	Did reviews take place on schedule?	[]	[}	ĺ]	[}	[]	[]
	Were the review proceedings formally documented?	[]	[]	[]	Į]	[}	[l
	Did top management attend formal reviews?	[)	[]	[]]]	[1	[j
	Did the customer/user attend formal reviews?	[]	[]	[]	[}	[]	[]
	Was an independent review team used (independent of project manager)?	[]	[]	[j	[]	[]	[}
	Did the project manager attend the formal reviews?	[}	[]	Į	j	[j	[j	Į	j
	What was the title, position and a chairperson of the formal reviews?		ili —	at	ion	0	f t	he				<u></u>	
	There were no formal reviews (adde	ed)											1

CONFIGURATION MANAGEMENT

106.	Was a	a software configuration management system employed?	
	a.	Yes (give title/name:)	ĺ
	ъ.	No ,	[
	z.	Comment:	{
107.	The :	system was base lined after: [AFR 300-15, 1978]	
	a.	System requirements review	[
	b.	System design review	ĺ
	c.	Preliminary design review	
	d.	Critical design review	į
	у.	Did not base line system (added)	Ţ
	z.	Other:	i
108.	Were	formal configuration control boards employed?	
	a.	Yes	l
	ь.	No	ŗ
	z.	Comment:	[
		title, position and affiliation of chairperson of [softwar	e]
Conf	igura	tion Control Board. (added)	
INFO	RMAL	REVIEWS AND WALK-THROUGHS	
110	How	often were "informal" reviews conducted between the	
		anager and his supervisor?	
	a.	Daily	[
	b.	Weekly	ĺ
	c.	Monthly	[
	d.	As required	[
	у.	There were no informal reviews	[
	z.	Other:	[
111.	Walk	-throughs [as defined by Weinberg, 1971] were used for:	
· = •	a.	Design reviews	ſ
	b.	Coding reviews	ı
	у,	Did not use walk-throughs	
	<i>,</i> •		

112.	How o	often were walk-thro	ughs sched	uled?			
	a.	Daily	[]	d.	As required		[]
	Ъ.	Weekly	[]	у.	Not used		[]
	c.	Monthly	[],	z.	Other:		[]
113.	Who i	normally attended wa	lk-through	s?			
					<u>A</u>	<u>B</u>	<u>c</u>
					<u>څ</u>	٠٠; نن:	₹ 7
						3	5/
	a.	Peer Programmers or	analysts		[]	1 1	(i
	ь.	Programmer or analy	st trainee	s	[]	[]	[]
	c.	Programmer or analy	st's super	visor	[]	[]	[]
	d.	Project manager			[]	[]	[]
	e.	Standards monitor			[]	[]	į l
	f.	Top level manager				[]	[]
	g.	User/customer			[]	[]	[]
	h.	Quality Assurance (added)		[]	[]	[]
	i.	Lead/System enginee	r (added)		[]	[]	[]
	j.	Test personnel (add	ed)		[]	[]	1 1
	у.	Did not use walk-th	roughs		[]	[]	[]
	z.	Other:			[]	[]	[]
114.	Were	walk-through minute	s/records	kept?			
					<u>A</u>	<u>B</u>	<u>C</u>
							3
					<u> </u>	3/	0/
	a.	Yes			[]	[]	[]
	ь.	No			[]	1 1	[]
	у.	Walk-throughs not u	sed		[]	[]	[]
	z.	Other:			. []	[]	l i

GENERAL	G	E	Ν	Ε	R	۸	I
---------	---	---	---	---	---	---	---

					hat would t	
					ke research	n in the ar
planning	, which as	spect woul	a you exp	lore:		

SECTION 7 - DIRECTING/MONITORING

RESPONSIBILITY AND AUTHORITY OF THE PROJECT MANAGER

a.	Full time, report to project manager
Ъ.	Full time, report outside project manager's orgn
c.	Full time, outside contractor/consultant
d.	Full time, customer
e.	Part time, report to project manager
f.	Part time, report outside project manager's orgn
g.	Part time, outside contractor/consultant
h.	Part time, customer
. The	project manager was responsible for:
a.	Technical quality
b.	Hire and fire assigned personnel (within firm policy)
с.	Evaluate performance of individual personnel
d.	Administration, budget, etc.
e.	Allocating computer resources
f.	Allocating non-computer resources
g.	Meeting schedule commitments
h.	Negotiating specification changes with customer
i.	Making a profit (i.e., operating within a budget)
z.	Other:
. The	title and position of the project manager's supervisor was:

120. The title, position, and number of people reporting directly

to th	ne pr	oject manager was:			
		<u>A</u>	<u>B</u>		<u>C</u>
		TITLE	POSITION		NUMBER
	a.				
	Ъ.		- Company of the Comp		
	c.				
	d.				
	e.				
	f.				
	g.	Project manager's span of con	ntrol is	p	ersons.
	у.	None/Unknown (added)	[]		[]
		cate the reviews the project and which he attended.	manager attend	ied and the	
			<u>A</u>	<u>B</u>	<u>c</u>
			Reviewer	Reviewee	Observer
	a.	Formal [management] reviews (added)	[]	[]	[]
	ь.	Walk-throughs	[]	1 1	[]
	c.	Budget reviews (added)	[]	[]	[]
	d.	Technical reviews (added)	[]	[]	[]
	у.	Did not attend/there were no reviews (added)	[]	[]	[]
	z.	Other:	[]	[]	[]
122. to b		project manager was expected added)	[by corporate	management]	
	a.	A technical supervisor			[]
	b.	A non-technical supervisor			[]
	c.	Project administrator [only]	(added)		[]
	у.	None of the above (added)			[]
	z.	Comment:			[.

MANAGEMENT AND MANAGEMENT TECHNIQUES

123. In the conduct of this project did the company or project manager make a conscious effort to apply any of the following management techniques?

			$\underline{\mathbf{A}}$	<u>B</u>	
			Company	Proj Mgr	
	a.	Management by objectives [Drucker, 1954]	[]	[]	
	b.	Job enrichment [Herzberg, 1977]	[]	[]	
	c.	[Motivation] theories [Maslow, 1943] (corr)	[]	íł	
	d.	Suggestion program	[]	[]	
	e.	Incentive and/or bonus program	[]	[]	
	f.	Participative management	[]	[]	
	g.	Management by exception	[]	[]	
	у.	None of the above (added)	[]	[]	
	z.	Others:	[]	[]	
124.	In u	sing management by objectives the object	ives were:	;	
	a.	Set by the project manager without inputeam member	it from the	1	[
	b.	Set by the project manager $\underline{\text{with}}$ input team member	rom the		[
	c.	Periodically reviewed			{
	у.	Did not use management by objectives			[
	Ζ.	Comment:			[
125.	The	project manager:			
	a.	Issued instructions to his subordinates	in writin	ıg	[
	b.	Delegated technical decisions to his di (Team chiefs)	irect subor	rdinates	[
	c.	Had an "open door" policy			ί
	d.	Employed quality standards defining what of each programmer/analyst	it was expe	ected	[
	e.	Employed <u>quantity</u> standards defining ho programmer/analyst should accomplish	ow much ead	:h	[
	f.	Monitored progress with the aid of a coand/or control room	ontrol boar	. d	{
	g.	Had a separate office to insure privacy	,		{
	h.	Had a personal secretary			{

denority	of the project manager?		
a.	Limited his ability to hire and fire his staff	[1
b.	Required clearance from the union prior to taking certain management actions	ĺ	j
c.	Union helped motivate team personnel toward better performance	[]
d.	Union labor standards retarded the project managers authority	[Ì
f.	Union labor standards enhanced production	Ĺ	1
g.	Union labor standards retarded production	į	;
h.	Union membership had no recognizable affect on the project	[;
у.	No team members were represented by a union	Į	į
z.	Other:	ſ	l
GENERAL			
	ou had it within your power to implement changes in the way ect was directed, or had the resources to devote to research trea, what action would you take?		

SECTION 8 - DELIVERABLES AND SUCCESSES

INTRODUCTION. This section of the survey presupposes that the project being reported on is complete or very nearly complete. The following question tests this supposition and provides qualifying data for the remaining inquiries.

qual	ifyin	g data for the remaining inquiries.		
128.	This	project is:		
	a.	50% complete or less	[į
	b.	51% to 75% complete	[]
	c.	76% to 90% complete	[1
	d.	91% to 98% complete	[]
	e.	99% to 99.99% complete	ĺ	j
	f.	100% complete and accepted by customer	ĺ]
	у.	Cancelled/not deliverable (added)	[]
	z.	Comment:	[1
the could and on the	quest he que d be the de he de	an provide two sets of questions we ask you to restructure ion in your mind to relate them to present project status. estion: "Was the project completed on or before schedule?" read "will the project be completed on or before schedule?" egree of forecast derived from your just stated position velopment continuum.		
MEET	S SCH	EDULE		
129.	Was	the project completed on or before schedule?		
	a.	Yes on schedule	[]
	b.	Yes,months early,% early	[]
	c.	No,months late,% late	[]
	d.	Yes, however specifications were reduced (added)	[]
	у.	Project not completed and/or no estimate available (added)	[]
	z.	Other:	[ļ
		ot completed on time what was the major cause of slippage ation]? (added)		
	a.	Change in requirement	!	j
	ь.	Change in method of design	[j
	c.	Bad initial estimate		
	d.	Unreasonable estimate, by either top management or the customer	[j
	e.	Limited authority over resources	í	

	r.	Excessive absences on the part of the project team members
	g.	Poor management (added)
	у.	Project was completed or is on schedule (added)
	z.	Other:
		roject was late, what portion (in percent is ble to change in requirements?
133. impr	What ove h	, if anything, could the project manager have done to is ability to meet the schedule? (Originally narrative)
	a.	Restrict the number of changes
	b. ·	Require formal system of changes
	c.	Require a firm requirements baseline
	d.	Conduct more reviews
	e.	Receive more authority over project
	f.	Made a better estimate of schedule
	g.	Perform better planning
	h.	Nothing
	i.	Better direction and control
	j.	Better and earlier requirement specifications
	у.	Project was completed or is on schedule
	z.	Other:
MEET	s cos	<u>r</u>
134.	Was	the project delivered within the original budget?
	a.	Yes, on cost
	b.	Yes, \$ under cost, % under cost
	c.	No, \$ over cost, % over cost
	d.	Yes, however specifications were reduced (added)
	у.	Project not completed and/or no estimate available (added)
	z.	Other:
		ot completed within the original budget, what was the this slippage [/cancellation]? (added)
	a.	Change in requirements
	b.	Change in method of design
	c.	Bad initial estimate

d.	Unreasonable estimate, by either the manager or the customer	į j
e.	Limited authority over resources	[]
f.	Excessive absences on the part of the project team members	[]
7. •	Poor management (added)	[]
у.	Project was completed or is within cost (added)	[]
z.	Other:	[]
	roject exceeded cost estimates, what portion of the overrunnt) was caused by a change in requirements?	7
	, if anything, could the program manager have done to is ability to meet the budget? (Originally narrative)	
a.	Restrict the number of changes	[]
ь.	Require formal system of changes	[]
c.	Require a firm requirements baseline	[]
d.	Conduct more reviews	[]
e.	Receive more authority over project	[]
f.	Made a better estimate of costs	[]
g.	Perform better planning	[
h.	Nothing	[]
i.	Better direction and control	[]
j.	Better and earlier requirement specifications	[]
у.	Project was completed or is within cost	[]
z.	Other:	[]
MEETS REQ	UIREMENTS	
	the delivered software meet the requirements as originally by the customer?	
a.	Yes	[]
b.	No	[]
у.	No requirements specified [and/or project not completed] (added)	[]
z.	Other:	[
	the customer accept the delivered system as meeting requirements in total, or did he identify exceptions?	
a.	Accepted system in total as meeting specified requirements	[.

ь.	identified exceptions
у.	No requirements specified [and/or project not completed]
z.	Other:
40. How pecified	was it determined that the system met the requirements (Originally narrative)
a.	Qualification/field test
ь.	System in operation
с.	Formal system/acceptance test
d.	Independent verification and validation
e.	Check against known answers
f.	Simulation
g.	System did not meet requirement specified
у.	No requirements specified and/or project not completed
z.	Comment:
	did the system not meet the required specification?
а.	Requirements changed
ъ.	Initial estimate bad
c.	Requirements ignored/customer accepted without correction (added)
d.	System met requirements specified
у.	No requirements specified and/or project not completed
z.	Comment:
EETS REI	LABILITY STANDARDS
	the delivered software meet the reliability standards y specified?
a.	Yes
ъ.	No
у.	No standards specified [and/or project not completed] (added)
z.	Comment:

a.	Requirements changed (added)
ь.	Not enough reviews and testing (added)
c.	
d.	System met the specified reliability standards
у.	No standards specified [and/or project not completed] (added)
z.	Comment:
iabil	ch, if any, of the following methods of measuring ity of the delivered software system were used in the [Gilb, 1977]
а.	The finished system was "salted" with known bugs (after integration testing and before sign off). The system was then debugged for a fixed (given) period of time after which the ratio of found known bugs to found unknown bugs was judged equal to the ratio of unfound known bugs to unfound unknown bugs to unfound unknown bugs.
b.	Curves of errors found to time spent debugging were calculated.
c.	A software reliability error prediction model was employed.
d.	Special test drivers were employed to stress system (added).
e.	Reported errors per upi: of time (MTBF) and system accepted when error r . reached acceptable level (added).
у.	No reliability measuring method was employed [and/or project not completed] (added).
z.	Other:
TS RE	LIABILITY STANDARDS
	the delivered software meet the maintainability standards ly specified?
а.	Yes
b.	No
у.	No standards specified and/or project not completed (added)
z.	Comment:

a.	
b.	
c.	
d.	Software met the specified maintainability standards
y.	No standards specified [and/or project not completed] (added)
z.	Comment:
	ch, if any, of the following methods of measuring the ability of the delivered software were used in the project? 977]
а.	Measured the time to repair the first "N" number of bugs reported (after integration testing and just before sign off). The average time to find a bug became the mean time to repair (MTTR).
ъ.	"Salted" the finished code with known bugs. The average time to find and repair the known bugs became the mean time to repair (MTTR).
c.	Cost to maintain program per unit of time and accepted when cost reached ar acceptable level (added)
у.	No maintainability measures were employed and/or project not completed (added)
z.	Other:
z.	Other:
EETS US	ABILITY REQUIREMENTS
	the delivered system usable? If so, how was this ation made? (Originally narrative)
a.	Yes, system is in production
ь.	Yes, system is in use
с.	Yes, independent verification and validation
d.	Yes, field or qualification testing
e.	Yes, customer was satisfied
f.	Unknown, has not been determined
g.	No, user was not satisfied
у.	No, the system was not delivered/cancelled
z.	Other:

SACRAMENTO AIR LOGISTICS CENTER MCCLELLAN AFB CA SERV--ETC F/6 22/2
RESULTS OF A SURVEY SOFTWARE DEVELOPMENT PROJECT MANAGEMENT IN --ETC(U)
DEC 79 R H THATER J H LEHMAN
SM-ALC/MME-TR-79-54-VOL-2 NL AD-A117 998 UNCLASSIFIED 4 1 5

GENERAL

149. Wh	at was the period of the final product warranty?	
a.	l year [] d. 6 or more years	(i
ь.	2 years [] y. No warranty	[]
c.	3-5 years [] z. Other:	[]
150. Wh day) fo	at was the approximate production rate (lines of code per r the entire project?	
a.	Average programmer/analyst	
ь.	Best programmer/analyst	
c.	Worst programmer/analyst	
z.	Comment:	[]
	w many lines of code were produced per page of tation?	
152. Wh	at was the cost per line of code?	
	s software development the pacing factor (critical path) project?	
a.	Yes, hardware was developed ahead of software	[]
ъ.	No, software was developed ahead of hardware	[]
c.	Yes, project was almost all software	[]
d.	No, hardware and software delivered together (added)	[]
e.	Varied, hardware and software alternated (added)	[]
у.	Project not completed/there was no pacing factor (added)	[]
z.	Other:	[]
	at percent of production [calendar time] was spent in the ng areas? (added)	
a.	Requirement specification	7.
ъ.	Preliminary design	7.
c.	Detail design	7,
d.	Programming/unit testing	%
e.	Integration testing	7,
f.	System testing	/u
у.	Project not completed (added)	[]
z.	Comment:	[]

	the project used on-line, interactive programming for development, was it:
a.	A highly effective development tool
b.	Effective in some cases
с.	Of limited utility
d.	A drain on hardware resources
e.	A nice toy
у. z.	On-line, interactive program was not used/unknown Other:
156. If programm	your experience reflects that on-line, interactive ing was an effective tool, in which situation was it ective? (Check or rank order)
a.	During development of code
b.	To try short length of code for possible use (simulation approach)
c.	During debugging
d.	During testing
e.	Not an effective tool
у.	Did not use on-line, interactive programming/unknown
z.	Other:
programm	your experience reflects that on-line, interactive ing was an effective tool what do you feel the improvement ammer productivity over conventional (batch) software ent was?
a.	Not an improvement
b.	1.5:1 improvement
, c.	2:1 improvement
d.	3:1 improvement
e.	5:1 improvement
у.	Did not use on-line, interactive programming/unknown
z.	Other:

manag	gers r requi:	major goals:	to deli system,	ver on where	time, w	s project met ithin budget, al software p	and meeting		
	a.	Extremely we	:11	[]	e.	Poor		[1
	b.	Very well		[]	f.	Failed		[1
	c.	Good		[]	z.	Other:		[]
	d.	Fair		[]					
159.	Give	some lessons	learned	from	his pro	ject.			
									
			•						
	 -								
									
									

general i	n nature and pertain to designed to be answered	software o	develop	ment projects as a w	/ho.	le,
(These qu	estions were originally	1, 2, 3, 4	, and	25 of Section Three)		
	e the following objective. (Enter number 1 throhould:					
a.	Be within budget	[]	f.	Be usable	[]
ъ.	Be on schedule	[]	g.	Depends on contract incentive	[1
с.	Meets requirements	[]		(added)		
d.	Be maintainable		h.	Varies with job (added)	[]
e.	Be reliable	[]				
	s reported in literature rs can do the work of 3					
a.	Yes				[]
ъ.	No				[]
c.	Do not know, insufficie	ent data/ex	xperien	ice (added)	[]
z.	Other:				[ì
programme	ou believe the support l r/analyst of unnecessary 2 to 1, what ratio do y	r tasks, bu	ut do r	ot believe the		
a.	1 to 1	[]	f.	Varies, according to skill level	[]
ъ.	3 to 1	[]		(added)		
с.	4 to 1	[]	g.	Do not believe/do not know (added)	[]
d.	5 to 1	[]	у.	Believe 2 to 1	[l
e.	10 to 1	[]	z.	Other:	ſ	1
	actions are customarily covered that a project i		the pr	oject manager when	·	•
a.	Wring hands				[]
ъ.	Assign more personnel t	to the proj	ject		[}
	•					
с.	Renegotiate schedule wi	ith custome	er		ĺ]
c. d.					[[]
	Renegotiate schedule wi				•]

h. Realign manpower (added) i. Use overtime (added) j. Replan the project (added) k. Varies, depends on situation (added) y. Nothing (added) z. Other: Other: Servey or the science of software engineering project (aggement)		
 j. Replan the project (added) k. Varies, depends on situation (added) y. Nothing (added) z. Other: Please furnish any additional comments or statement concerning s survey or the science of software engineering project 	h.	Realign manpower (added)
 k. Varies, depends on situation (added) y. Nothing (added) z. Other: please furnish any additional comments or statement concerning s survey or the science of software engineering project 	i.	Use overtime (added)
y. Nothing (added) z. Other: Please furnish any additional comments or statement concerning survey or the science of software engineering project	j.	Replan the project (added)
z. Other: Please furnish any additional comments or statement concerning survey or the science of software engineering project	k.	Varies, depends on situation (added)
s. Please furnish any additional comments or statement concerning survey or the science of software engineering project	у.	Nothing (added)
s survey or the science of software engineering project	z.	Other:
	his sur	vey or the science of software engineering project

REFERENCES - QUESTIONNAIRE

- AFR 300-15, Automated Data System Project Management, USAF, Washington, DC (16 Jan 1978)
- ASPR, Armed Services Procurement Regulation, Section III, Part 4, "Type of Contracts," Dept of Defense (1976)
- Baker, F. T., "Chief Programmer Team Management of Production Programming," IBM System Journal, Vol 11, Spring, (1972) pp 56-73
- Black, Rachel K. E., <u>BCS Software Production Data</u>, BCS Report F30602-76-C-0174, (Prepared for Air Force Rome Air Development Center), Boeing Computer Services, Inc., Seattle (1977)
- Boeing Computer Services, Inc., "Software Quality Assurance Guide," Prepared by BCS/SAMA Division Technical Staff, Document Nr BCS 40111 (Jun 1976)
- Brooks, F. P., The Mythical Man-Month, Addison-Wesley, Reading, MA (1975)

 Computer Decision, Hayden Publishing Company, Rochelle, NJ (Jun 1977

 Issue)
- Dijkstra, E. W., Notes on Structure Programming, In O. J. Dahl, E. W. Dijkstra, and C. A. R. Hoare, Structured Programming, Academic Press, New York (1972), pp 155-165
- DOD Manual 4120.17M, Automated Data System Documentation Manual, (Dec 1972)
- Drucker, Peter F., The Practice of Management, Harper and Row, New York (1954)
- Gilb, Tom, Software Metrics, Winthrop Publishers, Cambridge, MA (1977)
- Hartwick, Dean, "Test Planning," in <u>Proceedings</u>, 1977 National Computer Conference, AFIPS Press, Montvale, NJ (1977)
- Herzberg, Frederick I., "Orthodox Job Enrichment: A Common Sense Approach to People at Work," Defense Management Journal (Apr 1977)
- Heyel, Carl, The Encyclopedia of Management, Van Nostrand Reinhold Co., New York (1973)
- IBM, "HIPO A Design Aid and Document Technique," IBM Installation Manual, GC20-1851-1, IBM Corp (May 1975)
- Ingrassia, F. S., "The Unit Development Folder (UDF): An Effective Management Tool for Software Development," TRW-SS-76-11, TRW, Inc. (Oct 1976)
- Manley, John H., "Embedded Computers Software Cost Considerations," in Proceedings, 1974 National Computer Conference, AFIPS Press, Montvale, NJ (1974)
- Maslow, A. H., "A Theory of Human Motivation," Psychological Review (1943)
- Olsen, David G., "A Standardized Automatic Data Processing System Conversion Cost Program," A Research Study, Air University, Maxwell AFB, AL (May 1977)

Same was a core of the car of the

Gilb, Tom, Software Metrics, Winthrop Publishers, Cambridge, MA (1977)

Hartwick, R. Dean, "Test Planning," <u>Proceedings</u>, 1977 National <u>Computer Conference</u>, AFIPS Press, Montvale, NJ (1977)

Herzberg, Frederick I., "Orthodox Job Enrichment: A Common Sense Approach to People at Work," <u>Defense Management Journal</u> (Apr 1977)

Heyel, Carl, The Encyclopedia of Management, Van Nostrand Reinhold Co., New York (1973)

IBM, "HIPO - A Design Aid and Document Technique," <u>IBM Installation Manual</u>, GC20-1851-1, IBM Corp (May 1975)

Ingrassia, F. S., "The Unit Development Folder (UDF): An Effective Management Tool for Software Development," TRW-SS-76-11, TRW, Inc. (Oct 1976)

Manley, John H., "Embedded Computers - Software Cost Considerations," Proceedings, 1974 National Computer Conference, AFIPS Press, Montvale, NJ (1974)

Maslow, A. H., "A Theory of Human Motivation," <u>Psychological Review</u> (1943)

Olsen, David G., "A Standardized Automatic Data Processing System Conversion Cost Program," A Research Study, Air University, Maxwell AFB, AL (May 1977)

Yourdon, Edward, How to Manage Structured Programming, Yourdon, Inc., New York (1976)

Weinberg, Gerald, <u>The Psychology of Computer Programming</u>, Van Nostrand Reinhold Co., New York (1971)

APPENDIX C

COMMENTS ON AND ABBREVIATIONS USED IN THE REDUCTION OF ANSWERS

INTRODUCTION

The purpose of this Appendix is to present comments on specific questions, relationships between questions and their answers, procedures used in contriving missing answers, and to list and describe the abbreviations and codes used in this report. In addition, since a few of the questions were poorly written and/or in general misunderstood, some comments along these lines will also be reported here.

To conserve space and to provide a means of using a computer for analysis, all answers were abbreviated and/or coded (abbreviations and codes will be called just codes for the balance of this report). Because of space limitations and to assist in ease of processing, all alphanumeric codes were restricted to exactly three characters. The use of codes also had an additional advantage; it effectively disguised the answers so that the participants continue to remain anonymous.

The authors did not comment on all the questions and answers. If the authors have a comment, discussion, or observation on a question, their comments immediately follow the question number. Codes will immediately follow comments. If there are no comments, the codes will follow the question number. If the authors have no comment or codes concerning a given question, the question number will be passed by.

Four types of codes were used. The first type was general, applies to all questions, and will be defined after this introductory section. The second type was applicable to only one answer and appears after the question number in this section. The third type of code was general across two or more questions (e.g., FOR for FORTRAN; GPC for general purpose computer), and was listed once the first time it is used. Therefore, all Type Two and Three codes were defined after the question number in which they first appear. The code was separated from its explanation by a dash (--).

The fourth code type applied to questions 33, 51, 52, 67, 68, 90, 115, 127, 159 and 164 only. These questions were strictly narrative in nature

and did not lend themselves to multiple choice. To code these questions, all narrative sentences were broken into phrases generally containing a verb and object. These phrases were then given a code. The codes indicate whether the phrase concerned a planning, organizational, staffing, control, etc., function.

The authors attempted to use codes that were easy to recognize (mnemonic) to reduce the amount of flipping between appendixes.

The letters a through z indicated the sub-parts of the questionnaire. Parts a through w were general questions. Part x was used to indicate the entire question was not answered (ie., skipped). Part y was used primarily to show "none" of the answers applied or the questions were "not applicable". Part z was used for "other" answers.

TYPE ONE CODES

The code "YES" on the listing opposite a question (Sub-parts a through w) indicated that the surveyee "checked" the answer without comment and the answer is "yes" or "true". If a given question has a "blank" for an answer this indicates that the surveyee answered "no", or that the answer is "false" (this cannot be assumed if the surveyee did not answer at least one part in a multiple-part question).

Sometimes a pseudo question, Sub-part x, was created to indicate that the surveyee did not provide an answer to a given question because he:

1) did not understand the question, 2) felt it did not apply to his project or organization, or 3) just did not feel like answering it.

This was done so that the reader would not read a "no" when the correct answer was unknown to the authors. Sometimes the surveyee wrote in "unknown" otherwise it was coded "MIS" by the authors.

When answered, Sub-part y was coded "NON" to mean that the whole question was answered "no" or "none". The answer to Sub-part y was frequently supplied by the authors, therefore, one of the "C" codes was used (see later discussion). Sub-part z was coded "OTH" to mean that the surveyee wrote in another answer and the authors were not able to use it any other way (see discussion Appendix B).

As an added note, answers to Sub-parts a through w and z, Sub-part x and Sub-part y are mutually exclusive.

Several of the questions are multi-part. It is assumed that if a surveyee answered any one part of the multi-part question "yes" or "true" then all parts of the questions were answered. Any answers that were not checked were "no" or "false".

Other Type One codes are listed below. These codes were frequently used when the surveyee did not answer a question but made some comment in the margin. Other times these codes were used as the appropriate answer to a narrative question.

CFU -- Confusing, vague, don't understand

DEL -- Deleted by authors as revealing the participant

DIS -- Disagree with question as written, not true statement

D/K -- Don't know

INF -- Infinite, continuous

N/A -- Not applicable (on this project), didn't use

NEG -- Negative, non-contributary

NON -- No, none, or false

NOS -- No solution (yet), hard to solve

N/S -- Not specified/not selected

-OTH -- Other

UNK -- Unknown (also included "?" as an answer)

VAR -- Variable

MIS -- Question not answered (supplied by authors)

YES -- Yes or true

Upon occasion the authors felt it necessary to either answer the question for the surveyee, or change his answer. In the interest of honest reporting, the following codes indicate whether or not the answer was changed/contrived and the reason. These change codes were CO1, CO2, CO3, and CO4. CO1 has the highest probability that the changed answers reflect the true answer, CO2 next highest probability, CO3 next, and CO4 the lowest probability.

The change codes follow:

CO1 -- This answer was supplied by the authors and the answer chosen was based on an answer to a different question, e.g., if the surveyee answered Question 3 with any answer but c, and he did not answer Question 4, answer 4y was provided by the authors as CO1. Again, if the surveyee answered Question 46A but not 46B, answer 46By was coded CO1 by the authors.

CO2 -- These answers were manufactured by the authors by compartmentalizing answers provided originally in narrative form, i.e., multiple choice answers were formulated after all the answers were supplied by the participants. These answers were originally in narrative type questions or answers provided under "comments" or "other." An exception to this was when the participant wrote in "none" or another negative comment because a "none of the above" type answer was not supplied by the authors. When this happens a "none" answer is manufactured but coded CO1.

CO3 -- These answers redirected by the authors from the one given by the surveyees as "other" or "comment" to one of the existing answers which the authors felt was equally as good as the one placed in "comment", e.g., in Question 2 one of the answers placed under "other" was "airborne computer." The authors deleted the "other" answer and substituted code CO3 in answer 2e. This was done to reduce the number of possible answers while still retaining as much

accuracy as possible. CO3 was also used to answer a question that was redundant, i.e., the question appeared more than one time and was only answered once. The unanswered question was answered by the authors as CO3, e.g., if Question 34e was checked but 55a was not, answer 55a was coded CO3 by the authors.

CO4 -- These answers were redirected by the authors from a supplied answer to another answer. This was only done with atmost caution. It was done only if the supplied answer was not reasonable and there was reason to believe it was incorrect.

TYPE TWO AND TYPE THREE CODES

These Sections reflect the specific codes and comments concerned with each question and are ordered by the question number. If there is no code or comment necessary for a given question, it is skipped.

SECTION 1 - PROJECT IDENTIFICATION

- 3-4. Question 4 is dependent on Question 3. If the participant answered Question 3a, b, or z and did not answer Question 4, answer 4y was coded CO1.
- 5-12. Questions 6 through 9 are dependent on the answer to Question 5. If Question 5 was answered 5c through 5z (any or all) and Questions 6. 7, 8 or 9 were not answered, answer y was coded COl. Questions 10 through 12 are also dependent on the answers to Question 5. If Question 5 was answered 5a and/or 5b and Questions 10, 11 or 12 were not answered, answer y was coded COl.
- 8. Answers to Question 8a were divided into al, a2, a3, and a4. Answers to Question 8b were divided into b1, b2, b3, and b4. Answers a3, a4, b3 and b4 were only used if two machines and/or operating systems were reported.

The following codes were used for answers 8al, 8a3, 8bl, and 8b3 (manufacturer) if the manufacturer was given:

CDC -- Control Data Corporation

DEC -- Digital Equipment Corporation

GEC -- General Electric Corporation

HCS -- Harris Computer Systems

HIS -- Honeywell Information Systems

HPK -- Hewlett-Packard Corporation

IPM -- International Business Machines

INH -- In-house

LIT -- Litton Corporation

SDC -- Systems Development Corporation

SEL -- System Engineering Laboratory

UNI -- Sperry-Univac Corporation

ZER -- XEROX Corporation

The following code was used for Answers 8a2 and 8a4 (computer make and model) if the computer type was given:

GP# -- Number which follows "GP" was taken from the size class numbers reported under "General Purpose Computer Census", Computer-World (Jun 1978), a copy which follows this appendix.

The following codes were used for Answers 8a2 and 8a4 (computer make and model) if the computer type was not given or the code did not appear in the "General Purpose Computer Census":

GMI -- General purpose, mini-computer

SLG -- Special purpose, large computer

SMI -- Special purpose, mini-computer

The following codes were used for Answers 8b2 and 8b4 (type operating systems) if the type operating system was given. Many of the answers were abbreviated and not always completely understood by the authors. Answers are given as reported:

DVS -- DOSVS

GCO -- GCOS (GECOS)

IMS -- IMS

OSM -- OSMNT

OVT -- OSMVT

RPM -- RPM

RSX -- RSX

RTE -- RTE

RTM -- RTM

SCO -- SCOPE

SVS -- SYSIMS

SYM -- SYMON

SYS -- SYS II

The following codes were used for Answer 8b2 and 8b4 (type operating systems) if the name of the operating system was not given:

GOS -- General purpose operating system

SOS -- Special purpose (one of a kind) operating system

- 9. The codes used for the answers to this question were the same as for θ 0 Ouestion 8.
- 12. The codes used for the answers to this question were the same as for Question 8.
- 15. This question was not always clear to the participants. It was not clear to the participants how "one user at multiple locations" should be answered and their answer was written under "comments". The authors selected Answer 15b as being appropriate and coded it CO3.
- 13, 16-17. Questions 13, 16, and 17 are related. Some participants checked 16e for an in-house project (Answer 13a or 13b), others wrote "none" under "Other", and other participants left the question blank. Therefore, the authors elected to insert a new answer, 16y, and coded it CO1 if Question 16 was blank and the project was for an in-house customer.

If Question 16 was answered other than 16c and 16g and Question 17 was not, answer 17y was coded CO1. The following code was used for answer 17c:

COM -- Comparison of output results against known answers.

- 18. The total cost of the project was reported in dollars according to the following method. The cost d(1) d(2) d(3) ... d(N) can be represented by d(1) d(2) d(3) d(2) d(3) d(3)
- 19. The total cost of the software was reported using the same method as in Question 18.
- 20. The project's beginning and ending was expressed in months and years, with the beginning month being a number from 001 to 012 as answer a and the beginning year being the last two digits of the year as answer b; the ending month being a number from 001 to 012 as answer c and the ending year being the last two digits of the year as answer d. If the month was not given, Jun (006) was assumed.
- 22. The lines of source codes were reported using the same method as in Question 18.
- 24. The size of the data base was reported in words or bytes using the same method as in Question 18.

SECTION 2 - REQUIREMENT SPECIFICATIONS,

INPUT CONDITIONS, AND ENVIRONMENT

- 25-30. Questions 25 through 30 are related. If Questions 25 through 30 generally indicated that requirement specifications were not prepared and Questions 25 through 30 were not answered, answer y was coded CO3 (or N/Λ for Question 27).
- 26. If Question 25 was answered 25a and Question 26 was not answered, answer 26c was coded COl. If Question 25 was answered 25b or 25d through 25z and Question 26 was not answered, answer 26y was coded COl or CO3.
- 29. If Question 28 was answered 28b or 28y and Question 29 was not answered, answer 29y was coded CO1 or CO3.
- 30. Participants did not generally satisfactorily answer, nor apparently understand, Question 30d. However, if Question 30d was answered the code was used:
 - PDL -- Programming Design Language
- 31. Question 31 did not originally have a "Documentation not required" answer. Therefore, there was no way for the participant to indicate "none". If the participant was generally answering all the questions and he left Question 31 blank, answer 31y was coded CO3.
- 32. Question 32 did not originally have a "Customer did not specify" answer. Therefore, there was no way for the participant to indicate "none". If the participant was generally answering all the questions and he left Question 32 blank, answer 32y was coded CO3.

The codes to answer Question 32al and 32a2 was the same as for Question 8. Answers 32a3 and 32a4 were only used if two machines were reported.

The code to answer Question 32b was reported using the same method as in Question 18. Other codes were:

Percent number (%) -- percent of core used at specified time in development cycle (usually Critical Design Review).

PCT -- Percent used (unit unspecified).

The code to answer Question 32c was indicated in time to respond. Response time was reported in seconds using the same method as in Question 18, except the second position can be a minus sign for negative exponential.

Other codes were:

Percent Number (%) -- percent of available execution time

PCT -- Percent used (unit unspecified)

RTS -- Real time system

SRT -- System response or execution time (unit unspecified).

The following codes were used to answer Question 32dl. Answer to 32d2 was used only if two languages are reported.

AP1 -- AP-101

ASS -- Unspecified Assembler

CM1 -- CMS-2

FOR -- FORTRAN

HAL -- HAL/1

JOV -- JOVIAL

PL1 -- PL/1

TAC -- TAC POL/TAC MOL

The following code was used to answer Question 32p.

Number -- Number of paragraph modified.

The following codes were used to answer Question 32v.

CCR -- Critical component reliability only

HWR -- Hardware reliability specified only

MTB -- Mean time between failures

SAV -- Software system availability (up time)

SET -- Software evaluation testing

TSR -- Total system reliability/available.

The following codes were used to answer Question 32aa.

Number -- Time in months

BOA -- Basic ordering agreement.

33. Codes for Question 33 can be found under Type Four codes.

SECTION 3 - PLANNING

- 34-42, 55. Questions 34 through 42 and Question 55 are related. If Questions 34 through 42 generally indicated no planning was done and if any Question 34 through 42 was not answered, answer y was coded COl if 36y or 40y was answered, otherwise CO3 was used (Question 41 was coded N/A).
- 34. If Question 55a was answered and Question 34e was not answered, answer 34e was coded CO3. If Question 55b was answered and Question 34a was not answered, answer 34a was coded CO3. If Question 55c was answered and Question 34b was not answered, answer 34b was coded CO3.
- 35. Question 35 did not originally have a "None" answer. Therefore, there was no way for the participant to indicate "none of the above". If the participant was generally answering all of these questions and he left Question 35 blank, answer 35y was coded CO3.
- 36. There was a typo error in answer 36c. CEM should have been CPM (Critical Path Method).
- 37-39. Questions 37 through 39 are related. If Question 37 was answered 37b through 37y and Question 38 was not answered, answer 38y was coded CO1 or CO3. In addition, the answer "lines of code" was left out of the original possible choices. The authors felt that had this answer been provided more participants would have selected it. The answers that were based on size, i.e., length of the module, number of programs, number of instructions, etc., were lumped under "lines of code".
- 39. If Question 37 was answered 37e, and Question 39 was not answered, answer 39e was coded COl.
- 41. This question was slightly confusing. Some of the participants were not sure that the authors meant software only and total time. However, most of the answers appear to be reasonable.
- 42. Again, this question apparently was not clear since all of the planning activities did not always add up to 100 percent.
- 43-44. Questions 43 and 44 are related. If Question 43 was answered 43a and Question 44 was not answered, answer 44a was coded CO1.
- 45-46. Questions 45 and 46 are related. If Question 45 was answered 45y and Question 46 was not answered, answer 46y was coded CO1. This would have been a better question had we not specified only formal QA standards, but used instead either formal or documented QA standards. However, all of the participants appeared to answer with both in mind.
- 47. Question 47 did not originally have a "None of the above" answer; therefore, there was no way for the participant to indicate "none". If the participant was generally answering all the questions and he left Question 47 blank, answer 47y was coded CO3.

- 31, 48. Questions 31 and 48 are related. Question 48 did not originally have a "None" answer, therefore, there was no way for the participant to indicate "none". If the participant was generally answering all the questions and he left Question 48 blank, answer 48y was coded CO3. Also, Question 48 was so similar to Question 31 that if the participant did not answer Question 48 but he did answer Question 31, the same answers were used.
- 46-48. Questions 46 through 48 are related. If Questions 46, 47, and 48 were answered y and Question 49 was not answered, answer 49y was coded C03.
- 50. Question 50 did not originally have a "None" answer; therefore, there was no way for the participant to indicate "none". If the participant was generally answering all questions and he left Question 50 blank, answer 50y was coded CO3.
- 51-52. Codes for Questions 51 and 52 can be found under Type Four codes.

SECTION 4 - ORGANIZATION

- 53. This question was not always answered properly (e.g., many people filled in "project manager" under "other"). By referring to later questions, it was apparent thay they meant one of the multiple-choice answers, and it was changed by the authors and coded CO3.
- 55, 34. Question 55 is related to Question 34. If Question 34a was answered and Question 55b was not, answer 55b was coded CO3. If Question 34e was answered and Question 55a was not, answer 55a was coded CO3. However, if Question 55 was answered the following code was used to answer Question 55b:
 - ACB -- Administration Control Board.
- 56. On several occasions the participant answered either Question 56a or b and one of Questions 56c through f. This was frequently redundant and the answers to Questions 56c through 56f were eliminated.
- 58. This question is related to Question 22, Part One. If this question was incompletely answered, Part One answers and participants comments were used to answer Question 58 (coded CO3). Also, through hindsight and written comments, two more questions were added which appeared to make the answer set more complete.
- 59. Again, this question was not properly answered. The participants apparently did not understand the difference between authorized and assigned. However, if Question 78A was answered and Question 59 was not, the sum of answers to 78A was inserted.
- 60-65. Questions 61 through 65 are related to Question 60. If Question 60b was answered and Question 61 was not, answer 61y was coded CO1. This question could have been improved by including engineers with analysts.
- 63. If Question 61d was considered to be a "no" or Question 60b was answered and Question 63 was not answered, answer 63y was coded CO1.
- 64. If Question 120 was answered properly (and it often was not) and if Question 64 was not answered, the correct answer could be derived.
- 65. If Question 60b was answered and Question 65 was not, answer 65y was coded COl. There was a variety of answers written into this question. Apparently the title of "team chief" is not constant within industry. The more common ones that appeared to be similar were lumped under answer 65d (a new answer).
- 66. There were almost no answers to this question. Apparently project managers do not make use of some of these exotic titles. The only one constantly written in was "software engineering". In addition, since Question 66 did not originally have a "None of the above" answer there was no way for the participant to indicate "none". If the participant was generally answering all the questions and he left Question 66 blank, answer 66y was coded CO3.
- 67-68. Codes for Questions 67 and 68 can be found under Type Four codes.

SECTION 5 - STAFFING

- 68. Question 68 was duplicated. To avoid having to renumber all the questions from 68 on, the second Question 68 was renumbered 69f.
- 69-77. Questions 69 through 77, and 86 are dependent on Question 57. If Question 57 was answered 57y (no project manager) all y answers in Question 69 through 77 were coded CO1 (N/A for Question 73).

If Question 69f was answered the following codes were used: (These same codes were used for Questions 93, 94, 105h, 109, 118, and 120).

Senior Corporate Officers

- VPC -- Vice President, Data Processing
- VPE -- Vice President, Engineering/Functional Area
- VPG -- President or Vice President, General

Senior Management

- MCP -- Senior Manager, ADP
- MEN -- Senior Manager, Engineering/Functional Area
- MGR -- Senior Manager, General (includes Division Manager)
- MPA -- Assistant/Deputy Program Director
- MPD -- Senior Program Director (as opposed to Project Manager)

Project Management

- PEN -- Project Engineer
- PMA -- Assistant Project Manager, Deputy Project Manager
- PMC -- Project Manager, ADP/Computer
- PME -- Project Manager, Engineering/Analyst
- PMR -- Project Manager
- PMS -- Project Manager, Subsystem
- PMW -- Project Manager/Software
- PTD -- Technical Director/Manager

First Line Supervisor

- FAP -- Applications Supervisor
- FEN -- Engineering Supervisor
- FFS -- Fiscal Supervisor
- FLS -- First Line Supervisors, General (includes group leaders, task leader, section head, technical leader, manager, supervisor, head, etc.)
- FOS -- Operations Supervisor
- FPC -- Project Control Supervisor

```
FSA -- Application Software Supervisor
```

FSD -- Software Development Supervisor

FSE -- System Engineer Supervisor

FSQ -- Software Quality Assurance Manager

FSR -- Software Requirements Supervisor

FSS -- System Software Supervisor

FSW -- Software Supervisor

FSY -- Systems Supervisor

FTC -- Team Chief

FTE -- Technical Supervisor

FTI -- Test and Integration Supervisor

FTM -- Test Supervisor

FVS -- Verification Supervisor

<u>Lead ADP Personnel</u> (includes Senior, Lead, Senior Project, Chief, etc., ADP personnel).

LPA -- Lead/Senior Programmer/Analyst

LSA -- Lead/Senior Analyst

LSP -- Lead/Senior Programmer

<u>Lead Engineer/Functional Personnel</u> (includes Senior, Lead, Senior Project, Chief, etc., Engineering/Functional personnel).

LSE -- Lead/Senior Engineer

LSW -- Lead Software Engineer

ADP Personnel

CAN -- Analyst

CDA -- Data Base Analyst

CDV -- Software Developer

CHP -- Chief Programmer

CMS -- Software Configuration Management

COP -- Computer operations

CPA -- Programmer/Aanlyst

CPJ -- Junior Programmer/Programmer Aid

CPR -- Programmer

Engineer/Functional Personnel

EAN -- Engineering Analyst

ECH -- Computer Hardware Enginer

EHW -- Hardware Engineer

EIG -- Integration Engineer

ENG -- Engineer/Functional/Designer

ENJ -- Junior/Associate Engineer - Engineering Aid

ENS -- System Engineer

ENT -- Test Engineer

ESW -- Software Engineer

Supporting Staff

SAC -- Accountant

SAD -- Administration

SAS -- Staff Assistant

SEC -- Secretary/Typist

SLI -- Support Librarian

SMG -- Support Manager/Supervisor

SOP -- Functional Operation

SPC -- Project Control

STS -- Testing

General (Unspecified Personnel)

WMT -- Member Technical Staff

WOR -- Worker, Individual, Staff

Other Positions

OCU -- Customer

OMA -- Mathematician

OTH -- Other

72. The following codes were used to answer this question:

001 -- High

002 -- Average

003 -- Low

75. Since Question 75 did not oroginally have "None" for an answer there was no way for the participant to answer "none". If the participant was generally answering all the questions in this section and he did not answer Question 75, answer 75y was coded CO3. However, if he did answer, the codes used to answer Question 75f are the same as used in Question 32d. Answer 75f was divided into two answers, 75fl and 75f2, to accommodate two languages and used the same codes as Question 32d.

- 76-77. Questions 76 and 77 are related. If Question 76a or b was answered and Question 77 was not answered, answer 77y was coded COl. In addition, two new answers were provided for this question—physics and science (an oversight on the part of the authors).
- 78. This question confused many of the surveyees. However, the answers are included in hopes they will provide benefit to somebody.
- 80. If Question 78f was answered by a "none" and Question 80 was not answered, answer 80y was coded COl.
- 81. If Question 65a was answered by a "none" and Question 81 was not, answer 81y was coded CO1.
- 83-84. The answers to both of these were derived from the written answers provided.
- 85. The following codes were used in answering this question:
 - BBB -- Both within and outside the project resources
 - 000 -- Outside the project resources
 - WWW -- Within the project resources.
- 86. If Question 57y was answered and Question 86 was not, answer 86y was coded CO1.
- 90. Codes for Question 90 can be found under Type Four codes.

SECTION 6 - CONTROL

- 91-94. Questions 92 through 94 were dependent on Question 91. If Question 91y was answered, those Questions 92 through 94 which were not answered were answered with a y and coded CO1.
- 91. Again, as in Question 36, "CEM" was corrected to "CPM" and other systems were added. Several of those that were graphic in nature were lumped under the general type "graphics".
- 92. If Question 35c was answered "negative" and 92 was not answered, answer 92b was coded CO3.
- 93-94. If Question 91y was answered and Question 93 was not, answer 93y was coded CO1. If Question 91y was answered and Question 94 was not, answer 94y was coded CO1.
- If, however, Question 93 and/or 94 were answered the codes used in Question 69f were used.
- 99. If Questions 60, 61, or 65 indicated that teams were not used and if Question 99 was not answered, answer 99y was coded COl. The following codes were used in answering this question:
 - 001 -- Always
 - 002 -- Most of the time
 - 003 -- About one-half of the time
 - 004 -- Less than one-half of the time
 - 005 -- Seldom
 - 006 -- Never
- 99-101. If Questions 99d or 99e were answered "never" and Question 100 or 101 was not answered, answer 100y and 101y were coded CO3.
- 102-103. Questions 102 and 103 are identical to Questions 20 and 21, Part One. If Question 20 was answered "no" and Questions 102 and 103 were not answered, answers 102b and 103y were coded CO1.
- 104-105. Questions 104 through 105 are related. If Question 104 is answered 104y, and 105 is not answered, answer 105y was coded CO1.
- 105. Question 105 was originally incorrectly numbered. Therefore, it was renumbered 105a through 105h, and 105y. If Question 105h was answered the codes used in Question 69f were used.
- 106, 108-109. Questions 106, 108, and 109 are related. If Question 106 is answered "no" and Question 108 and 109 are not answered, Question 108b was answered CO1 and Question 109 was answered N/A.
- 106. There were almost no answers given to Question 106a; however, if answered, the following codes are used in answering this question:
 - CCS -- Configuration Control
 - CUS -- Customer supplied

HAC -- HAC system

IHD -- In-house developed

LIP -- LIP SVC

MAN -- Manual

SDM -- Software Development Manager

SKD -- SKD

483 -- MIL-STD-483

109. The codes used in answering this question were the same as for Question 69f.

110-114. The Questions 110 through 114 are related. If any of the questions are answered with a y, then those that are not answered will have y coded with a COl.

115. Codes for Question 115 can be found under Type Four codes.

SECTION 7 - DIRECTING/MONITORING

- 118. If Question 118 was not answered sometime an answer could be derived from elsewhere in the survey. If Question 118 was answered the codes used are the same as for Question 69f.
- 119. This question was completely confusing to many people who apparently did not know a definition of the term "span of control". Span of control was meant by the authors to be the number of people that were under the direct supervision of the project manager. From the large numbers that appeared, apparently most people answered the total number of people that were under the project manager.
- 120. The codes used for answering 120A and 120B are the same as for Question 69f. If Question 120g was not answered it could sometimes be derived from answers to 120A, B and C.
- 121. Question 121 is dependent on Questions 104 and 110. If Question 104 and 110 answered 104y and/or 110y and Question 121 was not answered, answer 121y was coded CO3.
- 123-124. Questions 123 and 124 are related. If the answer to Question 123 was "no" and 124 was not answered, answer 124y was coded COl. If Question 124 was answered 124a, b or c and Question 123 was not answered, answer 123Ba was coded COl.
- 123. Answer 123c had a typo. It was corrected from "moderation" to "motivation".
- 127. Codes for Question 127 can be found under Type Four codes.

SECTION 8 - DELIVERABLES AND SUCCESSES

In general, Section 8 lacked one point of clarity. It was the authors' intent to talk only about software deliverables and successes. However, the word software was not always emphasized, and we believe that some of the answers involved the entire project, which could have been partly hardware and partly software. Where the project was all software, of course, the answers applied to software. In those incidences where software was the pacing factor, then we are sure the answers also applied only to software. Where the pacing factor was hardware, you could be led to believe that the problems were associated with hardware and not software. The authors leave it up to the reader's discretion to evaluate exactly what the answers mean.

- 128-149. Questions 128 through 149, 153 and 154 are related. If Question 128a, 128b or 128y was answered (or some comment to the fact there was insufficient data to complete this section) and Questions 129 through 149, 153 and/or 154 were not answered, answers y were coded CO1 (Questions 132 and 135 were coded "N/A").
- 129-133. Questions 129 through 133 are related. If Question 129a was answered and Questions 130 through 133 were not answered, answer y was coded CO1. (Question 130 was coded "N/A".)
- 129. Answers to Question 129b were divided into 129b1 and 129b2, and answers to Question 129c were divided into 129c1 and 129c2. Answers b1 and c1 are reported in number of months; answers b2 and c2 are given in percent.
- 130. If Question 130a was answered "negative" and Question 132 was not answered, answer 132 was coded "N/A".
- 131. This question has been deleted from this modified version of Part Two of the questionnaire. It was meant to have been deleted during the last typing because it duplicated Question 129, but it was left in by error.
- 134-137. Questions 134 through 137 are related. If Question 134a was answered and Questions 133 through 137 were not naswered, answer y was coded CO1 (Question 136 was coded "N/A").
- 134. Answers to Question 134b were divided into 134bl and 134b2, and answers to Question 134c were divided into 134cl and 134c2. Answers bl and cl are reported in dollars using the same method as in Question 18; answers b2 and c2 are given in percent.
- 135. If Question 135a was answered "negative" and Question 136 was not answered, answer 136 was coded "N/ Λ ".
- 138-141. Questions 138 through 141 are related. If Question 138y was answered, and Questions 139 through 141 were not, answer y was coded COL.
- 141. If Question 138a was answered and Question 141 was not, answer 141d was coded CO1.
- 142-144. Questions 142 through 144 are related. If Question 142y was answered and Questions 143 and 144 were not, answer y was coded CO1.

- 143. If Question 142a was answered and 143 was not, answer 143d was coded CO1.
- 145-147. Questions 145 through 147 are related. If Question 145y was answered and Questions 146 and 147 were not, answer y was coded CO1.
- 145. If Question 145a was answered and 146 was not, answer 146d was coded ${\tt COl.}$
- 146. As stated, those questions that were originally narrative have been turned into multiple choice questions by taking the given answers and making them into logical groupings. There were too few answers to Question 146a to do this; therefore, it is left in its original narrative form.
- 155-157. Questions 155 through 157 are related. If Questions 155 through 157 indicate that on-line programming was not used in the development of this project and some or all of these questions were not answered, answers y were coded CO1.
- 159. Codes for Question 159 can be found under Type Four codes.

PART THREE

Questions 1, 2, 3 and 4, and 25 of Part Three are added to this report as Questions 160, 161, 162, 163, and 164.

- 161-162. Questions 161 and 162 are related. If Question 161a was answered and Question 162 was not, answer 162y was coded CO1. If Question 161c was answered and Question 162 was not, answer 162g was coded CO1.
- 164. Codes for Question 164 can be found under Type Four codes.

TYPE FOUR CODES

This section reflects the codes used to answer narrative or lessons learned type questions. With the exception of Question 164 all codes are listed by type rather than question.

Codes for Question 164.

- A01 Software engineering management is not different from R&D or prototype development of hardware.
- A02 It is an error to compare software development with the production phase of hardware.
- A03 Many questions are philosophic.
- A04 Software engineering is new.
- A05 Many approaches to software development management are valid.
- A06 Initial higher cost at the beginning of a project caused by using software engineering techniques will be offset by savings later on.
- A07 Software development is a tough management problem.
- A08 We do not know if the initial higher cost of software engineering techniques will be offset by savings later on.
- A09 Case studies of software development are required.
- All Cost and scheduling of a project are a problem.
- All Survey was too theoretical (orderly progress from beginning to end) for our project.
- Al2 Requirement specifications required extensive modification before development.
- All We should expect some of the "art" of software development to always remain with us and accept it.
- Al4 Survey was exhaustive and exhausting.
- Al5 Good luck.
- Al6 Too much emphasis upon quantification of subjective functions.
- Al7 Most important function is visibility of progress and automated procedures.
- Al8 Hope you get many returns.
- Al9 I hope you do not find my answers too difficult to understand.
- A20 Many good ideas in Questionnaire, good job.
- A21 You should follow on answers with telephone interviews.
- A22 Survey was redundant and could be shortened.
- A23 Good judgement and experience is more important than cook book techniques and tools.

- A24 Survey was not too applicable to be answered by customer.
- A25 My answers to these questions came from my experience in developing command and control systems.
- A26 Data should be collected by interview.
- A27 Separating software development management from hardware development management in this survey is a mistake.

Codes for Questions 33, 51, 52, 67, 68, 90, 115, 127 and 159

How the narrative answers were coded. The first element of the code (one or two letters) is:

- R -- Requirement function (this is a sub-set of planning)
- P -- Planning function
- X -- Design, Code and Test function (this is a sub-function of planning)
- 0 -- Organizing function
- S -- Staffing function
- ST -- Training
- C -- Controlling function
- CV -- Reviews
- CW -- Walk-throughs
- CS -- Software standards
- CM -- Configuration management
- CT -- Test and verification
- C -- Directing function

The second element (when used) is a number in order to distinguish between otherwise identical codes, except "R" which is used to designate the surveyee suggested R&D is necessary.

Requirements

- Rl Software requirement specifications (baseline) should have the following general attributes.
 - a. Accomplish its intended function of specifying the requirements.
 - b. A (more) formal project phase (function)
 - c. Based on a (thorough/careful) analysis
 - d. Correct
 - e. Useable by the software developer
 - f. (more) Complete
 - g. Clear, readable and understandable
 - h. Unambiguous and consistent
 - i. (more) Specific and detailed
 - j. Delivered on time (before beginning software design)
 - k. Reviewed prior to use
 - 1. (more) Emphasized throughout the project
 - m. Testable
 - n. Compatible with other functions (hardware)
 - o. Controlled and/or baselined
 - p. Any attributes or method will be acceptable
 - y. None required.
- R2 Software requirement specifications should not (be/have):
 - a. Include detail design
 - b. Only describe the process
- R3 Software requirement specifications should contain the following:
 - a. A description of the user's operation
 - b. Test requirements
 - c. Detailed test plan
- R4 Software requirement specifications should be developed jointly (or involve) personnel assigned to the following functions (this is also part of the organization function):
 - a. Contractor
 - b. Customer
 - c. User
 - d. Operator
 - e. Programmer
 - f. System engineer
 - g. Software engineer

- R7 Software requirement specifications should be developed through the use of:
 - a. Top-down techniques
 - b. Structured techniques
 - c. Hierarchical techniques
 - d. Incremental (phased) techniques
 - e. Modular techniques
 - f. Simulation techniques
 - g. (more) Automated tools
- R9 Miscellaneous lessons learned and/or comments concerning software requirements specifications.
 - a. Agree on specifications between customer and developer.
 - b. Make sure system design is feasible before beginning software design.
 - c. If you want the software to be reliable, maintainable, etc., put it in the contract.
 - d. More emphasis on reliability, maintainability and useability.
 - e. Many people do not know how to write requirement specifications.
 - f. MIL-STD-483 needs updating/improvement.
- RR R&D in software requirement techniques should include:
 - a. Developing a formal requirement methodology.
 - How to do requirement specifications development through simulation.
 - c. How to analyze requirement specifications.

Planning

- Pl The planning function should have the following general attributes:
 - a. Accomplish its intended function (correctly and cost effectively).
 - b. Based on a (thorough/careful) analysis.
 - c. (more) Specific and detailed.
 - Delivered on time (early in project).
 - e. (more) Fully documented.
 - f. Reviewed prior to use.
 - g. Reviewed throughout the project.
 - h. (more) Emphasized throughout the project.
 - y. None required.
- P3 Planning should include (be improved in) the areas of:
 - a. A development plan and procedures.
 - b. Accurate cost and scheduling.
 - c. Formalized and detailed testing planning.
 - d. Training plan.
 - e. A fall back position if problems develop.
 - f. Prioritizing work load.
 - g. Staff functions.
- P4 Planning and the planning function should be developed jointly (or involve) personnel assigned to the following functions (this is also part of the organization function):
 - a. Contractor.
 - b. Customer.
 - c. Project personnel.
 - d. Software analyst.
 - e. Programmer.
- P5 The project and/or project manager should be provided with the following:
 - a. More resources.
 - b. Better availability of (additional) supporting resources.
 - c. Better availability of (additional) computer support.
 - d. Better availability of development and test tools and support software.
 - e. Better availability of (additional) administrative support.
 - f. Adequate direction and guidance.

- g. A means of determining computational efficiency.
- h. Access to existing in-house expertise.
- i. A formal support library system.
- P8 In planning for a software development project, more time and effort should be allowed for the following project functions:
 - a. The requirement specification phase.
 - b. The planning phase.
 - c. The software development phase.
 - d. Cost and scheduling phase.
 - e. The design phase.
 - f. The programming phase.
 - g. The test phase.
 - h. Reviews.
 - i. Documentation
 - j. All phases of the development.
- P9 Miscellaneous lessons learned and/or comments concerning planning:
 - a. Do <u>not</u> allow the planning function to be pre-empted by short range tasks.
 - b. Determine, in advance, if the development facility will support the project.
 - c. Do not use "seat of the pants" planning.
 - d. The first time a system is built is always a problem.
 - e. All resources should be in close proximity.
 - f. Use vendor supplied OS.
 - g. Do $\underline{\text{not}}$ let customer change schedule and software design without contractor agreement.
 - h. Politics plays a more important role than technology.
 - Have more than a few "super stars" on the team if you expect success.
 - j. Estimate high; expect the worse.
 - k. Scheduling around holidays caused delays.
- PR R&D in the planning function should include:
 - a. Improvements in sizing, cost and estimating methods (accuracy).
 - b. A better method to assess impact of changes on cost and schedules.
 - c. Determining (research in) software life-cycle costs.

- d. Review of on-going projects to determine empirical planning factors for evaluation (and disseminate the best factors).
- e. Standardize planning, reporting, estimating and measurement techniques.

Design, Develop, and Code

- X1 The software development function should have the following general attributes:
 - a. A (more) formal project phase.
 - b. Correct.
 - c. (more) Specific and detailed.
 - d. Delivered on time.
 - e. (more) Fully documented.
 - f. Controlled and/or baselined.
- X4 The software should be developed jointly by (or involve) personnel assigned to the following functions (this is also part of the organization function):
 - a. User.
- X7 Software should be developed through the use of:
 - a. Project management system.
 - b. Top-down techniques.
 - c. Structured (development) techniques.
 - d. Modular techniques.
 - e. Appropriate (HOL) language techniques.
- X9 Miscellaneous lessons learned and/or comments concerning software development.
 - a. Consider all past experiences in planning a new project.
 - b. Have all unproven software technologies accepted by a review team prior to use on project.
 - c. Software development more a management problem than a technical problem.
 - d. More emphasis on automated software design tools.
 - e. Use industry standard software design techniques.
 - f. System designers should have more knowledge of software during early design stage.
 - g. Documentation and flow charting are very expensive.
 - h. Average software designer fails to see use for discipline until job is near done.
 - i. Project manager's approach should be validated.
 - j. Team members should select development methods used.
 - k. Use a common language where practical.

- 1. Use self-annotating source lists.
- m. Element requirement for flow charts (prior to code completion).
- n. More desk checking is required.
- o. Complete detail software design before beginning programming.
- p. Do not freeze design before completion of coding.
- XR R&D in software development techniques should include:
 - a. More design of (automated) design tools and aids.
 - b. Surveying and evaluating available software development tools and techniques.
 - c. Develop (and disseminate) design validation techniques.
 - d. Publish software design techniques standards.
 - e. Develop a system design language.
 - f. Research into software reliability: error types and solutions.

Organizing

- Ol The organizational structure (rules and authority lines) should accomplish the following:
 - a. Be defined.
 - b. Be enforced.
 - c. Define the authority line (better).
 - d. Define the responsibility (better).
 - e. Define a single, leadership function.
 - f. Define relationship between administration and technical personnel.
- O2 The role of ADP in the organization is to include:
 - a. Combine all programmers and analysts into one group.
 - b. Have the programmer and analyst report to the ADP manager.
 - c. Assign software specialist to the senior manager staff.
 - d. Have the ADP function report higher up in the project.
- O3 Require (or permit) the following organization structure and/or responsibilities:
 - a. Software to be responsible to overall system requirements.
 - b. Hardware to be responsible to overall system requirements.
 - c. Program manager (with the authority to do the job).
 - d (more) Authority to the technical subordinates (less central authority to project manager).
 - e. Software test team not under the project manager.
 - f. Software tes ing under software project manager.
 - g. A (large) technical staff.
 - h. Senior management to participate in project.
- 04 Miscellaneous lessons learned and/or comments concerning organization structure:
 - a. Interface at detail level with customer is costly and time-consuming.
 - b. Interface with IV&V contractor is costly and time-consuming.
 - c. Should not allow intermediate agencies between customer/user and the designer/programmer.
 - d. Should not allow involvement of organizations and/or personnel who cannot contribute to the software development.
- Of The organization structure (type) that is best suited for a software engineering project is:
 - a. A formal organization.

- b. Tailored/adapted to the job.
- c. Best suited to company environment.
- d. Depends on size of project.
- e. A functional organization.
- f. A line organization.
- g. A project (task) organization.
- h. A matrix organization.
- i. Organized under a project manager (with full authority).
- j. Organized under a manager with (strong) technical responsibilities.
- k. Organized under a manager with (complete) administrative responsibilities.
- 1. Organized under an ADP organizational function.
- m. Not organized under an ADP organizational function.
- n. Doesn't matter what type of organization.
- y. The project was not organized.
- 06 Other special organization structures (types) used or should be used are:
 - a. Special planning team.
 - b. Integrated programmer-analyst teams.
 - c. Project teams.
 - d. A standing review team.
 - e. Chief programmer teams.
 - f. Requirements analyst team.
 - g. Small design and/or programming teams.
 - h. (separate) Interface team.
 - i. (separate) Test teams.
 - j. (separat:) Documentation team.
- 07 The software development project (teams) should have as members:
 - a. Customers.
 - b. Managers.
 - c. Functional analysts.
 - d. Programmers.
 - e. Junior programmers/programmer aids.
 - f. Support librarian.
 - g. Lead (chief) programmers.

- h. Back-up programmers.
- i. Hardware vendors.
- 09 Miscellaneous lessons learned and/or comments concerning project organization types are:
 - a. The project organization should have a permanently assigned staff.
 - b. The matrix organization enables people to be removed for short periods of time without hurting project.
 - c. The matrix organization improved the overall training program.
- OR R&D in organizational functions should include:
 - a. Research for planning for an organization.
 - b. Research for a testing organization.
 - c. How many support librarians are required on a project.

Staffing

- Sl The staffing function should:
 - a. Provide an adequate, qualified staff.
 - b. Allow for early moving of personnel.
 - c. Provide for an experience and skill mix.
 - d. Identify quality of persons early.
 - e. Have "open ended" training programs as "personnel buffers".
 - f. Assign stronger technical personnel to head teams.
 - g. Apply appropriate talent of the appropriate jobs.
 - Use different level of programmers for different aspects of job.
 - i. Have (more) permanently assigned staff.
- S2 The staffing function should not (be/have):
 - a. Remove personnel to put out brush fires.
 - b. Build up the staff too fast.
 - c. Have too many (high-level) people during initial design.
 - d. Select software test team members from programmers who designed programs.
 - e. Have a general lay-off (reduction-in-force) just prior to starting project.
- S5 The project manager should (be/have):
 - a. Managerially and technically qualified for the job.
 - b. Good.
 - c. Experience in programming techniques.
 - d. Experience in management techniques.
- ST The training function should (be/have):
 - a. Provide adequate training.
 - b. A (more) formalized, staffed training program (function).
 - c. Better.
 - d. Screen personnel for skills to eliminate on-the-job training.
 - e. Identify training requirements early.
 - f. Provide training in new design technologies.
 - g. Provide training in basic programming and documentation.
 - h. Provide training in application function.
 - i. Provide training in documentation principals.

- j. Provide training in software acquisition.
- k. Provide training in management.
- 1. Provide training in hardware used.
- m. A better training facility.
- SR R&D in staffing should include:
 - a. (Better) methods of evaluating background/experience (vs project requirement).
 - b. A study of what factors influence proper mixture of skills.
 - c. Different skills and specializations needed for a project.
 - d. Investigation into what backgrounds leads to higher performance (production).
 - e. How do you staff for a changing project?

Direction

- Dl The direction function should (be/have):
 - a. Applied properly to effect a successful delivery of the software system.
 - b. (More) formal.
 - c. Documented.
- D3 The direction/motivation function should (be/have):
 - a. Motivate programmers to be aware of their importance.
 - b. Motivate programmers to be aware of being a professional.
- D5 Management should promote good and/or improved communications (interface) between:
 - a. Customer (user) and developer.
 - System designers and analysts/programmers.
 - c. Management and technical personnel.
 - d. Programming and test personnel.
- D9 Miscellaneous lessons learned and comments:
 - a. Highly motivated inexperienced staff can constantly out perform less motivated senior staff.
 - b. Never believe anything a computer vendor says.
- DR A R&D in direction should include:
 - a. How to improve and maintain communications.
 - b. Survey present methods and use the best.

Control

- Cl The control function should (be/have):
 - a. Provide exacting control and feedback over the project.
 - b. (More) formal function.
 - c. Enforce the use of controls already established.
 - d. Provide (better) project status visibility.
 - e. An automated means of monitoring software development.
 - f. Modularize work into definable tasks (WBS).
 - g. Control the requirement specification function.
 - h. Control project resources.
 - i. Software separate from hardware.
 - j. Include rate charting to monitor progress.
 - k. Record time vs activity.
- CV The review process should (be/have):
 - a. Hold effective reviews.
 - b. (More) periodic/extensive.
 - c. Done at critical milestones in project.
 - d. Qualified staff is available for reviews.
 - e. Review requirement specification for accuracy.
- CW Walk-through should (be/have):
 - a. Used as a peer review of the software.
 - b. (More) formal.
 - c. Used more extensively (scheduled).
- CS Software standards should (be/have):
 - a. Developed for more functions.
 - b. Expanded to a greater detail.
 - c. Enforced.
 - d. Simplified.
 - e. Monitored.
 - f. Developed for software design.
 - g. Developed for programming (coding).
 - h. Developed for documentation.
 - i. Developed for debugging tools.
 - j. Not have a fixed number of lines of code per product.

- CM Software configuration management should (be/have):
 - a. Provide control of software undergoing development.
 - b. (More) formally applied.
 - c. Flexable to accommodate required change.
 - d. Used (earlier).
 - e. Enforce strict adherence to baseline.
 - f. Formal document changes.
 - g. Control changes to baseline.
 - h. Restrict software change in requirement specifications to minor changes at the start of development.
- CT Test and verfication functions should (be/have):
 - a. More formally applied.
 - b. Emphasized.
 - c. Used.
 - d. Software error checking.
 - Incorporate traceability from requirement specification to final code.
 - f. Applied top-down.
- CR R&D required in control should include:
 - a. The development of traceability techniques.
 - b. Research into monitoring a project.
 - c. Research into how to test delivered software.
 - d. Methods to automatic configuration management aids.
 - Research into (automatic) control techniques, tools and procedures.
 - f. Automatic status reporting without frequent inputs from project individuals.
 - g. How to measure software productivity.

COMPUTERWORLD

THE NEWS WEEKLY FOR THE COMPUTER COMMUNITY
214 THIRD AVENUE, WALTHAM, MASSACHUSETTS 02154
RESEARCH DEPARTMENT TEL. 617/890-3770

(Used with permission of International Data Corporation, Waltham, MA)

June, 1978

Dear Census Respondee,

The Computerworld Research staff would like to thank you for your cooperation in responding to our Worldwide Computer Installation Census. It is only through such continued cooperation that we are able to successfully monitor the growth trends of the computer industry.

As an expression of our appreciation, we are pleased to present the results of a census report prepared by the staff at our publishing affiliate, EDP INDUSTRY REPORT. This "real world" census is the product of a direct extrapolation upon our Worldwide Computer Installation data base.

We hope you will find the enclosed information extremely interesting. We look forward to hearing from you again next year.

Sincerely

Computerworld Research Staff

SMALL BUSINESS COMPUTER CENSUS

The categorization of certain computers as "minicomputers" is based on marketplace definitions as perceived by IDC. Minis are general-ourpose in design but sold as tools, not just solutions, are available from the makers as complete systems, not just boards; are available to DEMs and usually discounted in volume buys; and are part of a family that has at least one product in the \$2,000-256,000 price range and comes with at least 4K RAM. Size classes are: (\$) Supermini; (T) Traditional Mini; (M) Micromini.

				SE PRICE	DATE OF	ACHRES	MUMBER	TOTAL	PRDERS
IAME 17	COMPUTER	PROCESSOR		(000,1	FIRST	CHSTALLED	INSTALLED	HURCHER	FOR 1976
APUTACTURES	HODEL	MODEL NOTES		AVERACE	HOITALLATION	38 U.S.	SUTSIDE U.S.		INSTALLATIO
Winced Information	System 1000	interdace X/16	24	19	3775	36	, ,	36	+6
Neg Lan	System 4000	Interdata X/32	- 19		/78	YA	XA	**	•
MOFICAN TOMASSASSING	AMS DE/TO	Nove-)	14		1/76	•	c		NA.
veteen, inc.	GP3-11	PDP-12/34	- '5	100	8/16	_ :	9	2	18
underson-Jacobson,	1400	AJ 1400 .	16	22	1/70	360	15	273	
nc	1500		20	25	7/77	40	0	•0	YA.
oplied Dora	Event	Event	13	20	2/77	19	1	30	150
Applied Gete Processing, Inc.	Resource/100	Yova 3/12	39	98	6/76	10		10	:5
All Computer Products	DASL	Yove-2/10	38	- 60	6/73				
Mote/ Four lorp	200	BPC 1/40	- 3		2/76				1.306
·	350	SPC 1300. Microsiaca b	34	14	9/71	500	176	1.076	1,000
	400	SPC 1300, Microdata b	17	45	9/71	100	1,268	2.948	5
	500	SPC 1300, Microdata 5	39	30	7/72	100			900
	100	SPC 1300, Microdata 5	51	45	3/75	100	92	1.82	
	110					300	308	60B	x
	700	BFC 1320	51	4	L/78		0	3	350
este limehertes, inc.	+000/15	BFC 1320	- 115	. ; 30	/17				
Mance . Immenutive, .nc.	+000/15 +000/25	PT -320	36	- 10	1776	218	•	:26	:56
icarea Corp.		471 -020	36	- 93	1/76	317		323)00
	lystem ?	Sicaros	16			0	. 3		
inary Seca System	UC091-1	4eve-1	-0	40	13/73	- 48			- 3
	3C0X-2	Just Move-)	95	120	1/76	20	0	20	•
	JC094-1	Eclipse	120	170	6/76	4	1		10
	7CD8-4	Duck Nove-3/D	200	285		. 16	3		;0
heroughs Corp.	W)	146	20	13	11/76	150	950	1.800	2,300
	1700	8700	20	67	3/73	2.400	1.450	4.050	1,300
	_9600	5800	12	52	5/77	300	170	• 70	, .,
watness Controls	frates 6	PSP-4/a	23	- 40	5771	100		100	30
OTBOTECLION	System 10	PDP-11/34/45/40/7F	• 3	75	6/75		ă		
Meruese Sasteme	Advisor []	Computer Auto.	35	45	7776	7 36		7 16	
reducts, inc.	Advisor III	Granter Aute.		iš	9/74	; ~		; ,•	
secado Deta, Inc.	80/20, 30, 40	Concept			1776	36			
	Concept II	Concept	25	45	9/75	100	13	213	xô.
	Concupt []]	Concort	27		1/78	***	٠,		
	CORRODE TV	General			4/79	Ÿ		?	ro
estury Computer	C-48	£-700, 400	- 32		3//3	158	- 18 -	186	
277	C-780	C-200, 400	14	**					•
	C-900	C-100, 100	27		6/76	. 40	10	30	**
	C-1000	0-400	40	+0	4/7:	100	20	120	•
	111 0000			10	6/77	. 15	•	15	MA.
inginesti Wiseron		G-200	15	- 13	2/71	560	4	400	
. ruerumet: 411961.06	George-40	C19/22008	16		1717	,)	,	1
	Searge-40	C1P/12009	26	34	/76	•	,		1
	George-7t	:17/1100B	26	15	176	343) 120) 665	1 150
	740 T 84 - 60	C1P/4400	4.3	10	12/74	A.		1	1
	Jther	C1P/22008	21	34	174				

Japiers Computer	(T-)	11ary 10va-1/12	- 18 -	+2	.6776	.00			
******	[[-] [V-]	10va-3/12 iclipse-5/130	,; ,;	*3 #0	10/75	:0		;0	20
099uc079	105	Computer 1000 Computer 1000		13	1776	:5	-55	155	·
omudata Systems	625	IBM Sector :		_ قنــــ	9/17			:20	, Jr
popular Hardware, Inc.	Series/1 2120	310	13	30	17-1				
	11300 11300	301 301	12	:20	1778	.90	3	: 55	10
	3230 -210	THT	15	30	3/75	1	;		.5
omputer Herizona	THI Distribution	PSP-11/34, '0	30	:00	10776		- 1		- 4
ore.	Syecom Summo (2-8	70P-8/a. (, a	-5	50	11/72	:43		.63	-0
oc.	35/40 [1-11	PDF-11 Yova-3/12	- 13	-0	10/77	25		25	
	DCC 1500 DCC 2500	DCC-416 c	.6 29		116	13	į	. 5 . 5	
	DCC 3700	DCC-616 :	-0			.0	3	.0	•
	Design Pers #312 Design Data EC300	Yeve-3/12 4 Eclipse 2/300 1	31 +0	75 150	\$/75 1/35	:20	10	. 10	:
ecision Data Computer	System/4	System/6	23	37	1/76	;		:5	. 25
14010	3200	1040	:9	- 23	:/?;	.86	-: '5	'50	:,350
igital Equipment	Jaconverse 300 Jaconverse 300 Jaconverse 300	PDF-6, PDF-11 PDF-11		.10 10	72	3,000	1,300	3,100	
tgitel Svetem	Seleny/5-130 Seleny/5-140	Alany/5 Alany/5	13	10	1,74 4/76		3	;	:5
	:alamy/5~150	halany/?	100	1 30	12/76	i i	ş		•
		Galamy/5 Jalamy/5	130	.80 290	\$/77 3/7*	:	_9		:
ints, inc.		Modcomp : I Microdata :600/10	38	.90	1/21	100)00	14 300
ducomp Carp.	E-130,200,300,400 E-600,700,800,900	POP-4		- 33	772		7	7	- 4
Quadera)	30P/7S	PDP-41	10	100	175	9 188		1. 197	**
Inencial Josepher	ECS/78 Svetom III/6	PDP-8 System (II	<u>;0</u>	-11	9/77		·		- <u>u</u>
lors. (Pedder)	Svetem III/S	System [II]	21	12	9/77 1/75	20	50	20	w
mini information	iyeres :II/16 :ispac/16	interdaca 6/16	30	15	4/75	-00	30	-50	
0 C 000	Glapac/32	Interdate X/32	46 18	:10	+/76 78	11	3	il.	
meral Automation,	→(spac/1 OH-130/2	Series/1 SPC-10/45	- 18 18	:0	12/16	:35	:23	150	
¢.	3H-430 3H-440 215-350 ABLE	SPC-16/65	30 ÷8	38 80	12/74	0 _	÷0 10	: 30 :8	
mersi information	215-150 ABLE	PDP-11/34	4.2	,	1/76	,	,		:
steen nersi Robotice Corp.	11/x3	281-11			776		10	105	
	70/X3 C0/X3	151-11 151-11	25	;; ;•	1/76 9/77	· 100	10	30	30
L'amputer forp.	Svecam 34	LST-11 :RI 49/50 :R1 49/52	30	35 50	11/74	(40	10	:90	
M Corp.	System/32	·*** · // /4	11	-:1	1/74	:4.900	5,300	:0,100	.0.20
ternational Computing	System 95/99	Nova-2/10	- }	- 50 - 15	10/12		3 -		2,30
cuhont liectronics	System III	Lockheed SUE	30	-50	:/15	340		100	
. Lac									
gicai Machines FB.	WW	ADAM	35	18	4/75	240	120	340	
rtin wolfe Inc. *	Hese Two 7000	3CC-116	54	41 +3	11571	140		; . 5	
crodata	Reality	Microdata 1600	32	-,0	12/73	1.170		1.110	40
ni-Computer Systems.	Vices .	Victodaca Express	30	- 50	11/76	396	- 350 -	110	;
Rucedia Computer	1774 II	1044-3/4 1044-2/4	29	- 21	1/17	10) <u>C</u>	35	
Aucedia Computer Ty.	1.775	4dVa-2/10	17	44	3/72	1.5	3	.5	;
	1.774	Move-2/10 Move-3/12	+0	59 55	3/72	21	3	:1	*
ico Digital	1776/A 1000 Series	Hyles 1G	25	-35	3776	75	ó		
A Corp.	9130	NCB	25	74	3778	- 1			- ~
	4150 4200	NCR	29 33	38 56	12/77	800	1,050	:.550	30
	1230	4CR	29	53	5/77	:00	e	:00	20
rfield Setasystems,	Mara-system	NOVE	33	- 10	5/73	250	•50	200	
fitheup Jots	108 500	Microdata 1600	- 30		2/78				
Atage	805 700	Microdata 1600	19	30	3/77	5	5	3	
	805 1000 805 2000	Microdata 1800 Microdata 1800	50 +3	75 100 72	5/72 30/73	55 65	<u> </u>	55	
ch & Associates	Pick System	*764 *781	64		11/73	12	;	16	10
egrammed Control	Pick System Prophet 21/1	7764 7781 71 960-8	- !!	75		38		 	
Carparation	Prophet 21/2	71 990/10		100	1/78	500		- 586	
etel	1007900	3	21	39	3/17	250		250	
	>50	37	12	30	11/75	302	: 02	484	4
	360 1200	97	42	56 54	11/76	15 213	23	20 236	
	1 300	Q7.5	62	54	3/27	-4	16	51	,
miai Jata Svaredu	Lnk-100	11.5 Randal	13		10/75			:95	
	Link-140 Link-200	tanda i Randa i	27	15	78 ;0/76	132	9	112	.6
	Link-300	Nova-2/10	34 36	+ 5	9/74	· · · · · · · · · · · · · · · · · · ·	! ;	. 137	
	Link-900 Link-900	tova-2/10 temini	16	50_	19/77	. 20	2	;0	
d. Sa <u>ich</u> an Managament	Tens No.	'(ave-)	38	58 11	5/17	10			*
e Lega					4777	148		400_	
ery-inlesc Systems	3C-7 91e1mcc-2000	Yevec 1,00	51	95	9/72	90			
	Sittmarr-1010	Nove-1/0	55	112	1/75	٠,	2	•;	
1-Star. inc.	716180cc-3000 TK-10	tove-1/1:		- 35	2/76	12		- ;2	
aguard Computer	- CDX-40	tova-3/12 taytheen tof 500	- }	95	3/76				
stone, inc.	74.00 22.00	Raytheon 805 300 Raytheon 805 300 2200	45	- 32	5/77	9.300	• 290	12,180	7,30
mg Laboratorios.	2200 VP	2200 VP	10	20	4/73 4/76 12/77	150	320	1.010	1.10
	2200 1919 2200 VS	1200 100	18		10/77	1 45	,	. 20	
eren Computer Corp.	Centurion (-A	2200 VS CC-201	18	- 80 (9	/77		 -		,
	Contucton II-A Concurson III	CC-203	27 36	30 36	75	124	3	7A 124	20
	Centurion IV	:c-204			1775			- 51	
ates Computer Corp.	200 118	/intex					NA	NA.	

GENERAL-PURPOSE COMPUTER CENSUS

Counts in the General-Purpose Computer Census are based on the best information available to IDC -- but are estimates nevertheless. Computer makers, as a rule, do not directly supply this type of data. General-burpose computers -- as characterized by IBM's 370, 303X and competitors -- comprise the bulk of digital computers by value. They are primarily character or byte oriented and programmed in higher-level language.

instead of being pegged to constantly shifting average values, size classes are based in currently marketed IBM products and other manufacturers' models that compete with them, e.g., a computer in Size Class 7 mould compete with an IBM 1033 or I68. (Other classes can be checked under IBM's column.) Note that many mainframe manufacturers also offer smaller systems that are included in the Small Business Computer Census. An "x" in the last column means none on order from the original manufacturer.

			WERA.E	AFE F	STALLATIONS	WELL OF	*3744	*7744 474
AND THE TERM	-96. EB	178 .445	**************************************	IRST INSTALLATION	VSTALLATIONS	TSIDE).	NOMBER OF NSTALLATIONS	MF11.22 RDERS
	-100.0			, 10 m		1131/11 3.	13112011.13	
Mer.		•	**.000 **.000 **.000		••		40	10
	704.4		·R , 300	44.19	"			
if firms **	- 127/100		4 400					
	91.712 91.722 91.800 92.900 92.700	:	1.100		*0	100		
	91.13		* '00	: ::		100	* 14	10
	12100		0.30	, ,		**	2.	
	42130	•		*:.:	- 10 - 11	:00	*40	
	42130 52900 531900 53190 53190 541,4700 84300 63190 84100 84100 84100 84100 84100	:	-1.00.000 i.30.000 i.21.000 i.21.000 i.25.300 i.25.300 i.25.300 i.25.300 i.25.300 i.25.300 i.25.300 i.25.300 i.25.300 i.26.300 i.26.300 i.26.300 i.26.300 i.26.300 i.26.300	27	:00	:45	-40	nc :
	13'00		300	44.73	IAC	755	*12	
	13800	•	1.100		.3	.11		ю
	94400		. 100	1 51 2 10 1 4 6 1 6 1 6 1 6 1 6 1 6			•	. 10
	61500 81500		11 300	3 63	• !	;		. 10
	to '00		99,300			.6	**	- 1
	50600 A1100	2		2	:	4	17	**
			1110,300					
	014		: 13,366			:57		
•	Targe =80-1 Targe =80-2 Creer=11 Creer=c11	:	17,300	1270	:		•	
	Crber-11		9 800	1/7 1		:	:	
	Crbot-c"1	;	1 14,100	4,		**		
	vber -/2	,	3 +7 .000	2.4		,	10	-
	report 11	:	14 .300		•	7	1	
	reat-		1135,300	2 12 2 12 2 13 2 13 2 13	10		::	- 1
	1947 - 1 /4	•	1 17 .00	ş. 14		•		
	rear - 14 star - 17 star - 175 star - 18		5 200 5 - 7 800 5 - 7 900 5 - 9 90 5 - 9 90 5 - 7 900 5 - 7 900 5 - 7 900 5 - 7 900 115 900 115 900 116 900 5 - 8 900 5 - 9		• •			
	-10 '4		118400			•		
	:-10	:	****	. •.2	;		:	
	10% 11.1150 11.70		1 600	. 943 . 2. 84 . 2. 19				
	1170	*	300	. 2. 86 . 2. 19 1. 86 8. 91	•	;	1.0	
	1300	,	14.00	9:43	44	3	•	
	14-00			1 64		1		
	1400		11,300	49	4		- <u>•</u>	
	400	•	·9.300	2781	:	- 1		
	+/00	:	1 -2.500	10	vá.		10	
	.200 1300 1400 1500 1600 4000 4000 4000 4300 4300 4300 4300 4	;	5 .8 .400 1 .200 1 .500 1 .	1/46 2/61 5/66		.0		:
	1000	- :	1120,300	1	4	7 P		
	1/00	- 1	1140 pag		n i		2.	:
	514F-100		280 300				•:	
			1213 340					إنسس
	TOTAL LA	•	313 336					.10
	1990	•	1 .000	11.5	** **	1	1	29
	1040/50	;	0 300	.0/44	: 65	: +0	, a ,	
	1060/70		0 300 300 1 1 100 200	0/44 0/47 1/72 1/73	20 40	140 95 12	205 215 12	:0
	2040 2050 705-0 1040/50 1040/70 1080/70 1010/70 7010/70 7010/70 7010/70	•			•4	12	•10	10
eres i l	4-41758	7	5 1,300 5 1,000 6 m, son 1 4,600 5 (1,300 11,700 5 11,000 5 17,000 5 17,000 5 18,000 5 18,000 5 18,000 5 18,000 5 18,000 5 18,000 5 18,000 5 18,000	1/74	-11	150		
	W-01/00 W-Level 42	- ;		0/76 0/76 0/76 0/76 1.76 10/76 1/79		*10 •70	+00	.10
	1-14-01 42 1-44-20 2-4-/10 1-4-/40		1 4,000	.9/74	195	710 20 65	103	
	8-44/10	:	11,300	11.76	.:	20	13	:50
	4-44/30		11.00	,.,	14	• • • • • • • • • • • • • • • • • • • •	*	. 90
	1-44/60		1 1,300	♦/ ? ?	:	•		
	1-04/50 1-04/60 1-04/03/07 2-06/10/11	;	3 27 van	.0/16 6/73 11/7-	;;	14	.11	***
	#-4015011.	3	5 34 ,080	11779	44	421	. 31 205	*0 13
	2-46/40	:	1 11,000	:0/**	12 +0 12	15	#7 94 01	11
	4-44/80	•	5112 DOM	10/74 :0/74 10/74	::	14	5	. 20
	#-66/10/1" #-66/20/2" #-66/40 #-66/60 #-66/80 #-66/80	•	1109,000	10/74	161	2.846		:.134
	N=40/80 5=00 Subcrent 5=50 G=100 G=200 G=600	2	1 1.900	0/70	240 85	7,066 1,390 980 28 29 25 26 26 135 64 27	1,110	1,336
	G-100	,	1 100		16	100	1,310 403 ,61 810	
	5-700 6-400	:	19,000	6761 5764 6785 18775 6771 1771	115	.28 201	.63	
	3-400	•	1 99,000	4/85	34 11	16	₩0 17	i
	5-4623/19	;	31,000	11/23	!!	26	17	:
		•	1 70,000	53	96 10	***	130	- ;
	>-4070/90	•	1106.000	1774	10	**	•••	
	2000 10	,	3 7,566	2176 7166 7167	!		120	
	C-600 1-600 1-600 1-6000/10 1-6000/10 1-6000/10 1-6000	•	1 L.908 3 v.905 5 tp.308 5 tp.308 5 tp.308 5 12.008 5 17.008 1 62.008 1 79.008 1108.008 1 77.508 1 tp.008	2/62	-	150	130 12 1.666 166 250 (67 370 161 380 37 205 111 63 127 127	
	G-Subretei 9-103/115	,		1/26	105 178 175 22	1,001 790 -23 145 120 150	1,980	:
	9-110/120	1	1 140	-44	175	.5	250	:
	4-125 4-200		1,000	.1/47	22	:45	(67	•
	4-110/170 4-13 4-200 4-2010 8-2010 8-2010 8-2010 8-1015 8-2016 8-1200	i	1 1 00	2/07 1/44 2/11 1/15 4/11 4/11 4/11	250 455 455 260 10	170	+01	:
	4-20 to	i	0.000	1/73	.03	٠,٣	161	
	4-2000 H-1015	:	11,200	*/??	240	140	100	
	H-2010	;	79,000	.,,,	110	**	:05	:
	4-1200	•	00	2700	110 220 17 42 41	140 27 95 91 26 21	11.1	
	#-2015 #-2000 #-2200	:	3 -1,500 3 20 500	2706 2771 4772	17	26	• 3	:
	4-1260	÷	1 19,000	1/06 3/72	ij	*	127	
	4-7070 4-7070 8-1700 8-4700	?	1 h, -09 5 1, -68 5 1, -68 5 1, 50 5 1, 70 5 h, 00 5 h, 00 5 h, 00 5 1 h, 50 5 1 h, 50 5 1 h, 50 5 1 h, 50 5 2 h, 60 5 3 20, 50 5 1 29, 60 5 3 20, 50 5 2 4, 50 5 2 4, 50 5 2 5 5 6, 50 5 2 5 5 6, 50 5 6, 50 5 6, 50 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	1/22	13	.:	.12	
	6-4200	,	1 48,500	2/79 9/68 2:89 -2/61	91 12	W	127	:
	4-4200	•	1 1 300	1. 10	14	10 16 15 17 17,400	15 24 28	•
	4-6/1600 4-6/1600	:	1 11 300	.2/61		10	2 6 23	;
	4-Subtotol [ctol	,	11.300	12/66	10 2,171 	1,406	3,375 	i

a or nerver un	OFFI TER	1178	AVERAGE 474THL1	SATE OF STREET	HETALLATIONS	HETALLATIONS	NUMBER OF INSTALLATIONS	TAL TATO
N. TACT. SEE	reteniles	- 355	MALE OF	*\$7.41.4710M		XTSIDE	SSTALLATIONS	- 30 - 30
	restate to	;	500		141	915		
	scom 1-10		100	10	1,320	33	3. 20	1
	3 suctuar \$=12 1 succes 3=13	:	.400 .400 .400 .400	1.70	1,320 1,320 50 .,950	10	450 2.455 4.620 3.120 7.030 4.710 17.695	1,500
					22, 230	140 213 - 740 - 750 1 180 - 779 3 865	:2, #95	000; 000; 000; 000; 000; 000; 000; 000
	1012	:	1 92,000 111,000 1119,000 14100 12,000 12,000 12,000 110,000 110,000 1271,000	24 TB TB 12 TB 47 TB 47 TB 57 TB 22 TB 77 TB 17 TB	:	:	:	.00
	01)		11 '9 000	1.76	, ·	100	. 250	100
	170/125		1,900	4, 11	90	:.020	1,120 /	i
	170/115	;	1 22,500	1.7		1,350	1.170	2.200
	170/145	•	18,190	7.71	00		1.200	2.200
	170/135	;	1 000	. 111		125	100	
	170/138	;	1100,300	(12) (13) (13) (14)		1,900 1,020 1,030 1,030 1,030 1,000	1,750 3,120 2,370 2,490 3,260 2,600 5,000 6,02 410	. 100
	10/100		85, 100	2.50	23	105	410	i
•	M Subsectat		1271,300				23, 27	
	160720		1 199 1 176 1 190 1	2 45 12 68 1793 199 1-193 1-195 1-196 1-196 1-196		20 100 100 100 100 100 100 100 100 100 1	2,980 110 140 1-930 16 360	- 540 6 6 6
	160/15	1	1,100	12.56	×	90	.**	,
	189/10	:	1 20	1/11	/10	400	x3	
	:40/47		300	1. 1.	00	90	***	
	160/10	:	12 306		130	.50	10	;
	100/47	:		11.66	•	.50 19 17	10	:
	340785	:	-181.300	3/49	• • • • • • • • • • • • • • • • • • • •	*;	•	
	160/91		1147,000	. 67			15	
	.; 30		100	. **	150		* 100 1: 150 140 23	
	. +01 -4		100		100	0	****	ì
	401-4	;		***	3		.I	
	0		17,100		**	ii	:-9	
	. +60 520		3.400	.3/61	:2	:0	14	
	110	1	100	3741		26 61 :0	59 149 36 201 5	,
	1340144		5 900 5 100 5 100 6 17 00 6 2 100 7 3 100	1 mm 4 mg 1 mg 1 mg 1 mg 1 mg 1 mg 1 mg 1 mg 1	5	13	12	;
	1010/16	:	21,000	790		13 14 7	•	
	1340/4	;	11,000	#/ No	24 12 1222	i	12 14 14 14	
	1401-41 1401-41 1410 1400 1400 1510 1510 1510 1510 1510 1500				19 411	1,445	1,137	.3.400
	45/4		11 100 11 100 11 100	67.4	19,413 20 35	;		
	49/1 45-4	:	1 1 100 1 1 100		35	2	.0	- 19
	\$150 \$450 \$450 \$550 \$560 \$270 \$460		1+00		 :}-		- 49	——: (
	10.10	1	.00	6/79 6 79 1/271 6/76 22/77 7/76 6/76 7/76 4/96 4/96 4/97 2/77 4/96 4/96 4/97 2/77 4/96 4/96 4/96 4/97 4/96	•	:	1	120 200 200 200 200 200
	1110	,	5 0.000 5 12.00 5 12.00 5 15.50 5 10.000 5 1.200	.17**	:00	.50	-10	, 44 200
	1100		1 .1.130	117	260 1 10		-10	100
	11/0	;	: 15,940 : 10,000		30	, i	**	40
		1	1 00	101	-15	• • •	-80	
	.encupy-190	;	100	1116	115		. , 310	
	Sparary-101		3 300	. 9***	#75 190	140	15	
	.ent utv - 190		1 10	17A0		195	***	
	*entury-101	:	111,100	1/24	300			
	6:80 Interpro	;	1 25,000	7.3	45	63	+80 -97 -210 -715 -715 -715 -715 -715 -716 -716 -716 -716 -716 -716 -716 -716	
	:L5-RMC		1 - 200 1 - 200 2 - 200 3 - 1, 230 5 - 12, 500 5 - 10, 600 5 - 2, 500 5 - 2, 500 5 - 2, 500 5 - 3, 500 5 - 3, 500 5 - 3, 500 6	2745	.0	197 140 100 195 .35 .4 43 .23		
	3100			:0/76	115 60 115 175 190 190 190 190 191 191 191 191 191 191	- 36		
ert fre-Univer	151-07-90 161-07-90 161-7-11 161-7-11 161-492 160-1009 1009 1009	;	3 2 388	4/47	10			
	-10 1/11		5 (0,700	4.43	.;	5 12 68 10 38 230 62 -3 225 4	**	ì
	*(8 11) -41 443	;	1 +0 100	1/44	13 41 235 205 120	:0	:12	
	•#	•	1 100	2.44	•1		419	
	1004	:	1 200	1785	:05	130	- 65 267	
	1030		1 1.300	1/43	120	-3	165	:
	. 197	:	: 43.000	.0/42	=	- 4	112	ì
	.104	:	1 11.305	1145	:52	n '3	269	
	1100		2,300	141	345	*15	160	•
	1046 1046 1046 1056 106 1106 1106 1106 1106 1106 1106	;	1 1 000 1 1 100 1 1 100 1 0	10-76 4-73 4-73 4-73 4-73 4-73 4-74 1-74 1-74 1-74 1-74 1-74 1-74 1-74	152 38 345 -40 230 -23 -23 -23 -15 -14 -11	91.5 -78 -20 -50 -50 -50 -7 -8 -5 -5 -5 -5	1900 	
	10/25	•	300	4/**	10	*0 ***	.00	150
	+0/10	:	1 :1 200	. 76	*2	77	.09	76
	9077079798 90786	•	29,000	5772 2774	16	16	**	10
	1100/10		11,500			<u>, i</u>	i	• • • • • • • • • • • • • • • • • • • •
	: 106/20 : 100/44	;	1 -7 900	**	15	12	*1	:0
	00/00/81/62	:	111: 000	14.55		i	•	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
	1100/04		1278.000	577				
	Suprete:		1 1.000		1,239	1.000	5,983 37	:,004
	1301 401 101 204404 93	•	10,000	1/34	•	-		
	1301 Seestra /8/11	1	1 +.600	.0740 9759 1764 9765 9765 1787 1278 1278 1278 1770	1,235	1,000	5,563 37 	;, 00
	Sector 10/25	1	100	*/63		:		
	Spectra 707+1	;	5 77 000	11/65	:35 :8 .1	i	:63	
	Spectra '0/44	•	1 44,500	1/40	20	:	7	1
	Spectre /0/00	•	1 10.000	F/ *0			23	
	Senetra 10/13 Senetra 10/13 Senetra 10/13 Senetra 10/13 Senetra 10/2-3 Senetra 10/2-3 Senetra 10/2-3 Senetra 10/2-3 Senetra 10/2-3 Senetra 10/2-3 Senetra 10/2-3 Senetra 10/2-3 Senetra 10/3-3 Senetra 10/3-3 Senetra 10/3-3	•	1 8,000 5 16,000 1 22,300 1 4,400 5 7,000 5 7,000 5 44,300 5 42,300 1 10,000 5 73,000 1 73,000 1 73,000 1 72,300 1 72,30	1/16	14	:	14	
	Spectra 19/7		3 17,998		14	:	96 17	
	Spectra '0/1 Spectra '0/8	;	1 22.300 1 16,500	1/64 1/71 10/71 10/71 10/71	34	:	34	- 1
	Senetra 70/15 Senetra 70/15 Senetra 70/15 Senetra 70/15 Senetra 70/15 Senetra 70/16	•	1 44,100	(0/7)	.22	21	22	1
	Tetal				14 14 15 17 18 12 12 18 18 18 18 18 18 18 18 18 18 18 18 18	1.889	163 163 19 3 29 3 4 36 36 36 17 36 22 515 743 181	1,00
**	1100 1		1 14 400	5767	122	31	163	
	ilgan :	;	5 21.500 5 28,500	12/44	¥ 4	";	.7	
	51 mm 8	:	1 71,500	4/71	3	10	:1 ••	;
				147.1		:	.;	
	110	1	1 4,000	4/73	103		***	
	110 110/100	1	1 4,000 14,200 17,000	6/67 11/70 12/66 4/71 13/71 6/73 11/76	16 16	3	76 62	
	130 130/340 140 1106	1	3 1a 606 5 23 500 5 23 500 5 21 500 5 71 500 5 34 000 5 14 200 5 26 000 5 8 500	6/73 11/74 +/40 11/84	32 36 3 48 105 36 19	1, 400 21 14 4 9 10 10 10	66 07 11 20 ,63 79 AZ 11	

EDP INDUSTRY REPORT

APPENDIX D

NARRATIVE AND CANDID (CLEAR TEXT) ANSWERS TO SELECTED QUESTIONS INTRODUCTION

This section deals with actual, unaltered, answers provided to a series of narrative response questions, specifically, Questions 33, 51, 52, 67, 68, 90, 115, 127 and 159 of Part Two and Question 25 of Part Three (which has been renumbered 164 of Part Two) and answers that were provided to questions which were not multiple choice, specifically 1, 8, 9, 12, 28, 29, 69f, 83, 84, 93, 94, 96, 105h, 109, 118, 120, 133, 137, and 148. Also, gratuitously included, at the end of this section are relevant excerpts from correspondence the authors had with respondents and prospective respondents during the course of survey development and circulation.

The narrative response questions asked for opinions on how (or if) the surveyee would have done things differently had he to do them over again (lessons learned), or what form of research he would wish to see undertaken with an eye toward improving the lot of the project manager. Other non-multiple choice questions asked for answers for which the authors could not provide a possible set of answers because of the wide variety of possible answers.

Each discernible response, whether included in the following pages or not, has <u>also</u> been analyzed and coded to facilitate entry into the computer data base. Since this reduction of comment to code destroyed some of the richness of prose, the authors felt it worthwhile to include this "verbal" section in the report.

The answers as they appear in the following pages have been "cleaned up" to assure anonymity from the standpoint of author, firm, and project. Identical or nearly identical responses have been eliminated as have incomplete (incompleteable) sentences and one worders. With the exception of the "clean up" and correction of the most obvious spelling and punctuation errors, those responses included in the following pages are as received. Though they do not in every instance answer the question asked, they do relate to the subject. As an aside, we make no claim to total understanding of every response.

QUESTION 1 What was/is your position in relation to the project you are reporting on?

ANSWERS

The following answers are the various titles of personnel who answered the questionnaire (grouped as to their relationship to the project).

a. Project Manager

Project manager

Project leader

Project engineer

Section manager

Task manager

Responsible for computers system hardware and software

b. Software Project Manager

Data processing manager

Manager of software engineering

Manager of software development

Software development group leader

Central computer subsystem manager

Software manager

Responsible for the computer activities

Programming supervisor/mechanization lead engineer

Technical director and director computer programming

Group leader

Software design manager

Manager, data processing and software

Group leader - software development

Group leader - systems design

Lead software supervisor

Assistant, standard software development

Project manager for software

Associate program manager

Group supervisor

c. Project Manager's Supervisor

Supervisor of project manager

d. Project Individual

Analyst
Software engineer
Special assistant to the project officer
Technical advisor for software acquisition
Technical supervisor

e. Corporate Officer/Staff

Director

Director, quality assurance

z. Other Independent technical advisor
Project historian

QUESTIONS 8, 9, and 12 If the target (production) and/or host (development) computer for this software capability was an off-the-shelf commercial system give: a. manufacturer, make and model, and b. operating system employed.

ANSWERS

The first column gives the question number answered.

Question	Manufacturer	Make and Model	Operating System
9	IBM	370 - 125	DOS-VS
12	IBM	370 - 125	DOS-VS
8	LEC	System III	LEC MPOS
9	LEC	System III	LEC MPOS
9	ROLM	1603	None
12	ROLM	1603	None
8	IBM	370/158, 168	VS
9	UNIVAC	1110	EXEC 8
8	UNIVAC	9480	None
8	CDC	System 17	
9	CDC	System 17	
8	Raytheon	704	
9	Raytheon	704	
8 9 12	Varian Varian Varian	V76 V76 V76	VORTEX II VORTEX II
9	NANODATA	QM4	As provided
12	DEC NANODATA DEC	PDP-10 QM4 PDP-10	As provided
8	CDC	7600/7700	SCOPE
9		7600/7700	SCOPE
8	Honeywell	316	
9	CDC	6600	SCOPE 4.0
12	CDC	6600	SCOPE 4.0
8	DEC	11/20, 11/40	In-house
9	DEC	11/20, 11/40	In-house
8	IBM	370	
9	IBM	370	
8	IBM		DOS
9	IBM		DOS
8	CDC	3800	SYMON ·
8	SEL	8500/8600	RTM (modified)
9	SEL	8500/8600	RTM (modified)

Question	Manufacturer	Make and Model	Operating System
8 9	CDC	7700	SCOPE
	CDC	7700	SCOPE
8	IBM	360/67	TSS
9	IBM	360/67	TSS
12	CDC	175	NOS
12	IBM [·]	370-158	
12	CDC IBM	6600 360/65	
8	DATACRAFT	6024/4	DATACRAFT
9	DATACRAFT	6024/4	DATACRAFT
12	DATACRAFT	6024/4	DATACRAFT
8	SCC	660	
9	SCC	660	
12	SCC	660	
8	XEROX	SIGMA-5	XDS
	INTERDATA	70	RBM
8 9 12	IBM IBM IBM	AP-101 360/75	Special purpose OS/360
8	Harris IBM	Slash 5 360/370	
9	Harris IBM	Slash 5 360/370	
12	Harris IBM	Slash 5 360/370	
9	CDC	CYBER 72	
12	CDC	CYBER 72	
9	IBM	370-75	EOS
12	IBM	370-75	EOS
8	UNIVAC	1108	
12	UNIVAC	1108	
8	XEROX	SIGMA 5	RBM
9	XEROX	SIGMA 5	RBM
8	Hewett-Packard	2100	RTE
9	Hewett-Packard	2100	RTE
9	IBM	370/168	OS 21.6
8	INTERDATA	8/32	OS 32 MT
9	INTERDATA	8/32	
8	Hewett-Packard	21 MX	RTE-11
9	Hewett-Packard	21 MX	RTE-11

Question	Manufacturer	Make and Model	Operating System
9	IBM	370~158	
8	UNIVAC	1108	EXEC 8
9	UNIVAC	1108	
8	IBM	360/75	OS (modified) OS (modified)
9	IBM	360/75	
8	UNIVAC	1108	EXEC 8
9	UNIVAC	1108	EXEC 8
8	IBM	370/168	SYS-IMS
9	IBM	370/168	SYS-IMS
8	CDC	6500	SCOPE 3.4
9	CDC	6400	SCOPE 3.4
12	CDC	6500/6400	SCOPE 3.4
8	CDC	CYBER 73	SCOPE
9	CDC	CYBER 73	SCOPE
8	CDC	3800	SYSTEM II B
9	CDC	3800	SYSTEM II B
8	IBM	360/65	OS/MVT with HASP OS/MVT with HASP
9	IBM	360/65	
8	DEC	PDP-11/45	RSX-110 VER 6A
9	Honeywell	6000 .	GCOS
8 ,··	UNIVAC	90/60	IMS-90
	IBM	370-148	DOS/VS

QUESTIONS 28 and 29 In Question 28, it was asked - Was it necessary to rewrite the specifications before proceeding with design? And, if the answer was "yes", to specify the percent rewritten. Question 29 asked - If it was necessary to rewrite the specifications, what was the reason? ANSWERS

The answer to Question 28 is placed in parenthesis before the answer to Question 29. The number is the percent of requirement specifications rewritten.

- (20%) Clarification and resolve conflicts between specifications.
- (Yes, it was necessary, but never done, design documents were changed.) Change of scope, inconsistency.

(Specifications were written along with design.)

- (20%) Added scope.
- (30%) Discussions with customer during their review of, or after, their approval of requirement specifications, resulted in major requirement changes, e.g., positive attendance reporting by optical sensing changed to excess reporting by batch.
 - (60%) Changes in hardware design and errors in specifications (80/20).
 - (60%) Clarifications and refinement of requirements.
 - (80%) Original requirements ambiguous and incomplete.
 - (50%) Changes in scope.

(Was reworked during design) Changes in the objectives and sequence to be employed in the system demonstration.

- (95%) Normal and expected interaction of total system design.
- (50%) Customers and internal project dialogue.
- (20%, significant change traffic continued after design base-line frozen, all the way into qualification test. Resulting in about 20% change from original base-line design.)
- (100%) Specifications absolutely unuseable ambiguous, not testable.
 - (50%) Continuous Government redirection and program rescoping.
 - (50%) Customer requirements changed or expanded.
 - (15%) Refinement of performance of objectives.
 - (20%) Changing requirements and inconsistent specifications.
- (50%) Lack of details; omitted many essential characteristics, especially interfaces.
- (80%) To insure that the functional requirements were understood to permit further design.
 - (15%) Changing requirements.

- (10%) Increased system knowledge.
- (Small number of changes, but customer had some add-systems.)
- (25%) Customer direction, mistakes, too much use of preliminary requirements.
 - (20%) System not fully understood.
 - (30%) Maturity of the requirements (block update).
- (30%) To make the job [more] easily done or to overcome some difficulties which were identified later.
 - (90%) Incorporate specifics in place of functional requirements.
 - (25%) Changes directed by customer.
 - (50%) [changed from] Manual to computerized procedure of testing.
 - (100%) Additional technical insight.
 - (20%) Consistency and change in tactics.
 - (40%) System would not work.
 - (40%) Changes in scope, errors, lack of customer expertise.
 - (20%) Clarification and improvement.
 - (75%) Lack of sufficient detail.
- (20%, 2 phase operation existing operating system installed in first phase no change new operating system with new bells and whistles required, requiring approximately 20% rewrite due to learning curve response.) Customer became familiar with capability and customized to fit his particular need.
 - (100%) Only very broad requirements were furnished by user.
- (100%, New specifications were written after the first design failed!) Total system was inoperative due to system (both hardware and software) design flaws.

QUESTION 33 If you could affect the method by which requirements are specified, or were able to initiate research into improving the requirement specifications function, what action would you take?

ANSWERS

Define a formal "requirements phase" whose output would be a contractor/customer agreed upon baseline for design work.

I would add dynamic simulation capabilities to a package like CARA-URL/URA or PSL/PSA.

Make sure it is a joint commitment and effort by customer and developers.

The method is relatively unimportant, unless the customer wants to impose a design. Otherwise, any readable statement of the requirements will do, as long as it is clear and complete.

Insure accessibility of key people to review specifications as to accuracy.

Establish incremental requirements development compatible with total project development.

Joint contractor/customer preparation of requirement specifications of all ICDs for agreeing to cost or schedule.

A more complete and relatively unbiased study should be made of various proposed techniques being advocated.

If possible, the system definition should be firmed up early so that the changes at the start of software development are only minor adjustments rather than redirection of the effort.

MIL-STD-483 is dismal in that the Part 1(b5) specifications outline calls for too much detail and actually obscures requirements. For example: An equation is not a requirement but merely a shorthand statement of a relationship. Most people don't know how to write a requirement specification. The usual result is a description of the process.

Intense interface with user community. In this case, the system was procured by one branch for use by another. The second branch was not brought into the picture until the acceptance phase - disaster.

Institute formal requirements methodology, testable and analyzable.

Promote more implementer involvement in specifications writing and more structured specifications.

More vigorous application of structured design.

Expand the team concept (vendor and customer) so that complete understanding may be fostered on both sides.

Coding should not proceed until requirements are complete. Requirements should be more complete and should be written (in part) by end users (mission operations team) in conjunction with customer/engineer/programmers.

Develop traceability techniques.

Require complete set of specifications before initiating software design and implementation. Use HOL source code as primary design document.

With respect to mission software, requirements should be developed jointly with the customer prior to contract award. This is perhaps the best possible way to go.

Improve communications between systems design groups and software project.

Requirements should be known early enough to allow time for review.

Requirement specifications should be prepared by users/operators/development team. Keep teams small.

Invoke operation oriented description of performance requirements. Keep design detail out of requirement specifications.

More control to establish an earlier baseline.

Requirement specifications should be developed top-down with traceability at all levels.

Elimination of redundancy in documentations by making B-5 specifications first version of C-5 type specifications (Refer to Ml_-Standard 490). Use Parnas' Hiding Assumptions list to define basis for choice of modules and for good user communications.

Involve software engineers early in the system definition and allow for more "up-front" simulation.

Insure that the user specifies the functions that the system must perform and that the developer obtains a full understanding of these required functions.

Improve organization of requirements hierarchy to facilitate top-down implementation.

I would revise MIL-STD-483 to limit Part 1 CPCI specifications to performance requirements and associated contractor/GFE interfaces, and include detail algorithm definition - equations (coding requirements) as a part of the Part 2 CPCI specifications.

More detailed system design specifications prior to start of software design.

Earlier system definition, and a software design freeze at some point during the development.

Would remove all intermediate agencies and monitoring functions from between the customer (user) and the analytical functional designer/programmer.

Requirements should be verified as to "testability" prior to release. Also, contractors should be allowed to participate during source selection in the requirement specifications process.

Top-down documentation, with baselines, formal change procedures, and more involvement.

Extend the period of requirements definition; automate the analysis of requirements statements for completeness and consistency.

A detailed requirement specifications should have included a great deal of analysis, trade-offs, simulation (perhaps) before being started. A formal SRR should then take place. CM should be employed for all changes to requirements (on going), thereafter, or in other words: 1. Emphasize completeness/thoroughness of first detailed requirement specifications, 2. Be flexible for constant requirement changes thereafter - which may impact schedule; however, CM/CCB will decide.

Insist on complete identification of requirements and establishment of configuration control over them prior to proceeding to the next phase of development.

QUESTION 51 If you had total control of the planning function within your organization, or were able to initiate research into how to improve the planning function, what actions would you take?

ANSWERS

Increase the planning phase - complete detail design, prior to code initiation. Require full system walk-throughs.

Initiate more detailed level of planning. Improve cost and schedule estimates.

Based upon empirical data, I would initiate research which would result in the development of highly accurate cost estimating methodology for all phases of software development.

Careful planning, correct design, periodic review and testing. Verification and documentation should be necessary actions to be taken.

Increase system designers awareness of software during system design (trade-off).

More concentration on staffing and skill mixes.

Place more emphasis on the requirements of supporting resources (computer utilization, size, speed, etc.). Scope the development facility as to its adequacy to support the application.

Stop customer from freezing the design before detail coding (programming) requirements are complete.

Better staff training - better communications with systems engineering.

Combine all analysts/programming activities under one control group.

I would organize a highly proficient planning team from management and technical personnel to develop project plans.

Place a sendor software specialist on staff in top management to assist in decision making.

Start planning earlier.

Assure that system definition and implementation allow adequate design and development time.

Devote more effort to planning. Involve programmers/analysts to a greater degree. Require full documentation of plan. Continue to review plan as development proceeds.

Various activities must be prioritized before detailed action is undertaken.

Emphasize involvement and contribution of the "people doing the work" in the planning function.

Allow more time for planning.

Design tools for building emulators.

Analyze applicability of the University of Michigan System Design Language.

Survey available methods; apply most promising and weed out losers.

Allocate greater percentage of the time to planning.

Set up data base from all ongoing programs which would be available to new programs.

Reduce the number of people and increase the calendar time.

Set means to provide total access and communication with existing in-company experience.

Expand the coverage and contractual significance of the computer program development plan CPDP as defined in AFR 800-14. Insist that a CPDP be outlined during the competitive phase to assure a credible bid (fixed price plus incentive).

Require top level software design and module interface specifications prior to detail software design.

Early system definition and software design freeze.

Capture data from ongoing programs. Transfer knowledge/techniques among projects, i.e., standard planning, measurements, reporting and estimating techniques.

Complete detailed development plans and procedures early in the project.

Demand that validated project management procedures be employed.

More senior management personnel should be involved.

Collect software metrics on productivity and quality.

Increase user involvement in designing and testing phases.

QUESTION 52 If it were in your power to make changes in the way technical decisions are made concerning programming techniques, test procedures, documentation standards, etc., what action would you take?

More emphasis on modern structured technique and automated tools.

Get dollars, survey available methods, apply most promising and weed out losers.

Study and evaluate variety of modern, automated techniques to be ready for appropriate application.

I would prevent outside "experts" from imposing their pet techniques and controls in areas where they are inappropriate, misguided, and costly.

Use more junior programmers for trivial aspects of the job.

More emphasis on phase design effort and better planning for testing. Development of more test aids such as program flow and structure analyzer and aids to the programmer for fixed point machines as long as we continue to use fixed point for flight equipment.

Review what's in general use and publish recommended methods as a standard. No such document currently exists.

More detailed plans must be made and reviewed before actual coding begins. Short range goals must not be allowed to dominate planning function.

Use standard industry techniques for flight software development.

More automated tools, more formal walk-throughs.

Pass all "technologies" through technical control panel for assessment prior to use on project.

Greater standardization throughout the project. More rigid monitoring and enforcement.

Have more desk checking.

Develop design validation techniques.

Select one able, right person (who has experience in programming techniques, as well as management) to be program manager. Give direction and guidance concerning objectives, procedures, schedules, etc. (other necessary actions). The program manager will take care of the rest.

Increase programmers' awareness of their importance, and the importance of their professional demeanor.

I would improve the entire spectrum of project standards to be enforced.

Structured programming concepts and chief programmer.

More top-down structured design.

Insist on a common language where practical. Include test requirements as an integral part of the requirement specifications.

Simplify the number of different standards in use.

I would give additional impetus to all aspects of testing, giving it equal status with other major phases of software development, allocating perhaps 40% of project budget to this activity. I would insist upon certain standards associated with documentation content, but relax format considerations.

Increased formalization of techniques. Too much "by the seat of the pants" planning, dicision making takes place. Much of this is due to "the first time" problem - remaining due to an unstructured environment.

Select a simple set of rules for program organization and structure and concentrate on making programmers follow them.

Assure that past experience and techniques are considered. Document rationale for all decisions.

Set means to provide total access and communication with in-company experience.

Eliminate requirement for detailed flow charts prior to coding.

Use self annotating listings in lieu of flow charts.

More reviews, walk-throughs and configuration management procedures.

Follow more structured software development approaches. We are planning to do this for our FDC delivery.

QUESTION 67 Which of the many forms of project organization do you feel contributes the most to the success of the project?

ANSWERS

Best organization is dictated by the job to do, [and] the talents of specific people available.

Matrix.

Task oriented.

Single clear leadership role.

The lead programmer, single architect approach.

Direct control, multi-function, integrated program/analyst/manager

Matrix, with strong technical leadership.

Each form has appropriate application under different conditions, constraints, and objectives.

Management by personnel who understand both technical and administrative areas.

Program manager and a technical manager.

Project organization.

Line organization.

A changing organization that adapts to the work being performed.

Line organization responsible for all programming functions.

Matrix organization for overall ADP organization - structuring and dedicating project teams to individual projects.

Chief programmer - acts as interface from line organization into the rest of the matrix.

Team organization.

Line organization with three independent sub-groups; requirements/analysis, programming/software system design, and test.

Mixing of disciplines at the lowest level.

Systems - subsystems by functional areas.

Matrix.

One in which the project manager has both programming and technical responsibilities with permanent assignment of personnel.

A project manager with full authority for the project. Use of a chief programmer subordinate to the project manager.

QUESTION 68 If you had it within your power to make one change in the way the project was organized, what action would you take, or if you had resources available to undertake research in any area of project organization which aspect would you explore?

ANSWERS

Better planning.

More planning.

Visibility of project status.

Doesn't really require any research. Matrix or functional will work equally well depending on the size of the project.

Implement the team approach with the programmers, back-up programmers, and librarians as identifiable entities.

The extent to which technical and administrative functions should be separated should be explored.

Permanently assigned staff for duration of project.

More technical staff direction.

Implement a separate test function at project initiation. Create a separate documentation function.

Would explore planning (scheduling) and testing organization.

Provide sufficient calendar time for each group to complete its task without retime. Particular emphasis must go on requirements and specifications.

Metrics; so we talk less and know more.

I would spend the necessary amount of time thoroughly researching available empirical data to arrive at the most accurate possible methodology for estimation of software development cost (all phases).

Software activities report to higher level within project.

Use chief programmer teams.

Would place hardware and software totally subservient to system.

Include a separate software interface team (a group responsible for the top level software design).

Would employ separate software test team that is not under control of the software manager.

Program status/productivity measurement aids; automated configuration management aids.

Assign a thoroughly experienced project leader at the very beginning. Validation of proposed project management methods.

No changes in organization. There were some things the organization should have done differently.

Assign stronger technical personnel to lead task manager positions. I wouldn't have had a personnel cut just prior to the effort.

QUESTION 69f The project manager was appointed, or selected for this project by:

ANSWERS Grouped by relationship to project manager.

a. Senior ADP Manager

Senior ADP manager through experience

Assistant manager, engineering operations

Manager, software development laboratory

Senior ADP manager

Project reviewing authority

The project review authority as delegate of division general manager

Division general manager (V.P.)

ADP manager

Line manager

Manager two tiers up

Support organization manager with the approval and concurrence of the program manager

Line manager for software

Senior line ADP manager

Assistant director business systems development

Director of operations

Functional section chief

Department manager/Division manager

Department chief

b. Senior Non-ADP Manager

Director of development

Director of engineering

Avionics chief engineer

Director

Line organization

Department management

Department head

The avionics manager

Systems project engineer

Project engineer

Section chief

c. Program Manager (as opposed to project manager)

Program manager

The program manager of the total project

d. Senior Corporation Officer

Vice President

President

Senior management

Program Vice President

Upper management selection

Company general manager

The division vice president for Federal Systems

He was appointed by top level management

Assistant vice president

The line executive

e. <u>Customer</u>

Customer

SPO chief

f. Other

Ex officio

Agreement between line and staff management

QUESTIONS 83 and 84 Question 83 asks what percent of the programmer/analyst staff were originally computer operators who moved directly from machine operations to programming. Question 84 asks if the former operators make successful programmers.

 $\underline{\text{ANSWERS}}$ The answer to Question 83 - the % of operators who became programmers - is in parentheses before the answer to Question 84.

- (0%) Very, if they get the BA or BS required for the promotion.
- (5%) The transition from operators to programmers was very successful, especially in the area of JCL procedures.
- (0%) In scientific programming area there has been less chance for machine operators to become programmers. I haven't seen any.
 - (10%) Yes, the Best!!
- (10%) Yes, and their familiarity with OPS problems and procedures was useful.
- (0%) We have used this technique in other areas of the matrix organization usually they work best in an operation-system maintenance function i.e., recurring versus design.
 - (1%) One did.
 - (15%) Average in quality.
- (0%) Avionics work emphasizes engineering skills, not programming skills.
 - (UNK) I remember one who turned out to be very good.
 - (4%) Yes, good/average.
 - (5%) Yes, but limited in scope.
 - (55%) 2 proficient
 - 1 mediocre
 - 2 incapable
- (2%) Yes, their long experience as operators on these systems and their knowledge of policies help them.

ALCOHOMORPHICADOR SON A

(5%) Yes.

QUESTION 90 If it were within your power to make any changes, or initiate any research in the area of staffing, what would you consider the most fruitful area for modification or study?

ANSWERS

How to maintain/improve communications.

Experiment with more specialized staffing; i.e., with a number of more functional roles rather than a group of programmers/analysts.

Investigate what personnel backgrounds lead, or tend to lead, to high performance ADP personnel.

Use different categories of programmers with different levels of expertise for appropriate aspects of the project.

Have a sufficient number of "open ended" research and sustaining programs to serve as buffers for personnel so as to provide more flexibility in staffing.

Staff should not build up too fast. Pure, high-level people for initial design might be best.

Majority of the problems encountered involved outside pressures - such as removing personnel for short periods to handle brush fires - matrix organization has solved that problem. Matrix organization has also improved overall training program which now takes place in a functional area - eliminating much pressure from the individual projects.

Study the number of librarians required for a job of a particular size.

Need better method of evaluating background/experience vs project requirements.

Training in design techniques.

Add programmer aid or support librarian to the team.

More formal training in the engineering applications.

Training in new technologies.

Identify the quality and training requirement of persons to be hired early in project start-up.

I would like my team members to get well trained if anyone is in need of it.

Staffing for an evolving project, i.e., soft schedule.

Personnel screening techniques to minimize the on-the-job-training.

Replacing personnel.

Software staffing must include a cross section of personnel types. Hardware/Software background vs software only, experience vs youthful ideas, etc. - Study to determine the factors which most affect the proper mix for a given project.

The balance of young to old and experience to inexperience.

Participate in personnel selection.

When you are in trouble a programmer is not a programmer if he doesn't know anything about the hardware and/or software to be developed.

Back to the drawing board.

Measurement of productivity and correlation with selection factors.

QUESTION 93 Which manual reporting procedures were used in project monitoring and management? At what level did they originate, and how high did they go? How often were they aggregated, condensed, or edited as they moved up the chain?

ANSWERS

Report Title	Lowest	Highest	No. of
	Originator	Recipient	Aggs/Edits
Wkly Activity	Worker	Proj mgr	2
Proj status	Sect mgr	Proj mgr	1
Significant chg	Proj mgr	Proj mgr	-
Wkly Activity	Programmer	Proj mgr	3
Wkly Activity	Sect head	Proj mgr	1
Proj status	Proj mgr	President	2
Wkly Activity	Proj leader	DP Admin Chief	-
Proj status	Proj leader	DP Admin Chief	
Wkly Activity	Anal/Prog	Gen mgr	2
Proj status	Mgr	Gen mgr	1
Wkly Activity	Programmer	Gen mgr	3
Proj status	Ld Prog/Anal	Gen mgr	3
Significant chg	Programmer	Proj mgr	3
Wkly Activity	Programmer	Division VP	1 3
Proj status	Sr Anal	Division Pres	
Wkly Activity	Programmer	Proj mgr	1
Proj status	Proj mgr	Sr mgmt	1
Significant chg	Tech leader	Sr mgmt	1
Wkly Activity	Prog/Anal	Proj mgr	2
Proj status	Prog/Anal	Proj mgr	2
Significant chg	Tech leader	Proj mgr	2
Wkly Activity	Programmer	Proj mgr	0
Proj status	Proj mgr	Division mgr	2
Wkly Activity Proj status Cost vs Performance Rpt	Programmer Proj engr Fin Anal	Proj engr Cust/Div mgr Proj engr	0 2 0
Wkly Activity	Programmer	Software engr	0
Proj status	Software engr	Computer sys mgr	0
Wkly Activity	Branch Chief	Director	
Proj status	Branch Chief	Director	
Significant chg	Branch Chief	Director	
Wkly Activity	Gp leader	VP	4
Proj status	Proj engr	VP	3
Significant chg	Proj engr	VP	2

	Lowest	Highest	No. of
Report Title	Originator	Recipient	Aggs/Edits
Wkly Activity Proj status	Subsys mgr Subsys mgr	VP Customer	1-2 2
Significant chg	As required	Cascomer	2
Wkly Activity	Lead engr	Proj mgr	4
Proj status Significant chg	Proj mgr SW Proj mgr SW	Proj mgr	2 2
Wkly Activity	WPM	Proj mgr	1
Proj status	WPM	Proj mgr Customer	2
Wkly Activity	Prog/Anal	Proj mgr	
Proj status	Prog/Anal	Proj mgr	
Significant chg	Prog/Anal	Proj mgr	
Wkly Activity Proj status	Programmer Programmer	Proj Officer Proj Officer	
Significant chg	Programmer	Proj Officer	
Wkly Activity	Proj mgr	Engr VP Division Pres	4 5
Monthly status	Proj mgr		
Proj status	Sect head	Proj leader	Wkly/Mo reported
Monthly CSCS/R	Funct engr	Proj mgr	
Wkly Activity	Team chief	Programmer	1
Proj status Significant chg	Team chief Team chief	VP VP	2 2
Wkly Activity	Programmer	Proj mgr	0
Proj status	Chief Prog	Proj mgr	0-1
Wkly Activity	Staff	Program mgt	0
Proj status Significant chg	Program mgt Staff	Customer Proj mgr	0
Proj status	Programmer	Program mgr	
Significant chg	Programmer	Program mgr	
Wkly Activity	Supvr (gp engr)	Proj mgr	2 1
Proj status Significant chg	Prog Cont org	VP Proj mgr	2
Wkly Activity	Designer	Customer	
Proj status	Designer	Customer	
Significant chg	Designer	Sys prog mgr/cust	
Wkly Activity Proj status	Programmer Prog cont officer	Dept head Site director	
Significant chg	Funct dept head	Program mgt	
Wkly Activity	Gp leader	Program mgr	3
(wkly prog rpt) Proj status	Programmer	Gp leader	1
•	-		

Report Title	Lowest Originator	Highest Recipient	No. of Aggs/Edits
Wkly Activity Proj status (monthly rpt)	Gp leader Gp leader	Prog director Customer	5
Wkly Activity	Branch prog	Dept head	1
Proj status	Proj mgr	Dept head	0
Significant chg	Proj mgr	Dept head	0
Wkly Activity	Prog/Anal	Top mgr	3
Proj status	Prog/Anal	Top mgr	3
Wkly Activity	Individual	President	6
Proj status	Team leader	President	5
Wkly Activity	Chief prog	Proj mgr	1/wkly
Proj status	Proj mgr	President	
Wkly Activity	Gp head	Proj mgr	0
Proj status	Proj mgr	AVP	1
Significant chg	Proj mgr	AVP	1
Wkly Activity	Gp head	Program mgr	2
Proj status	Gp head	Program mgr	2
Significant chg	Individual	Sect head	1
Wkly Activity	Sect head	Program mgr	1
Proj status	Sect head	Program mgr	1
Significant chg	Sect head	Program mgr	1
Proj status	Cog engr/cog prog	Sect chief	
Significant chg	Cog engr/cog prog	Sect chief	
Proj status	Cog engr	Proj mgr	1
Wkly Activity Proj status Significant chg	Gp leader Proj mgr Proj mgr	VP VP	1 1 1
Wkly Activity	Team as input by individuals	Program mgr	1
Proj status Significant chg (schedule variance)	Team Team	DOD/ADP VP DOD/ADP VP	3
Wkly/Mo Activity	Programmer	Proj mgr	0
Proj status	Prog mgr	Division mgmt	
Wkly Activity	Indiv contrib	Proj mgr	2
Proj status	Work unit ldr	Proj mgr	1
Significant chg	Work unit ldr	Proj mgr	1
Proj status	Proj mgr	Directorate	1
Wkly Activity	Branch	Director	
Proj status	Division	President	
Significant chg	Division	President	

Report Title	Lowest Originator	Highest Recipient	No. of Aggs/Edits
Wkly Activity	Task mgr	Dept mgr	1
Proj status	Task mgr	Division mgr	1
Significant chg	Task mgr	Division mgr	1

 $\underline{\text{QUESTION 94}}$ Which automated reporting systems were used in project monitoring and management?

ANSWERS

System	Lowest Originator	Highest Recipient
Manhour/Activity	Worker (time card)	Froj mgr
Manhour/Activity	Programmer	Proj mgr
Manhour/Activity	Lead programmer	Proj mgr
Manhour/Customer	Programmer	Next level above proj mgr
Manhour/Activity	Programmer	Proj mgr
Manhour/Activity Manday/Task	Prog analyst Prog analyst	Proj mgr Proj mgr
Manhour/Activity Manday/Task	Accounting Accounting	Proj mgr Proj mgr
Manhour/Activity Manday/Task	Fin analyst Fin analyst	Proj engr Proj engr
Manhour/Activity	Software engr	Computer subsys
Manhour/Activity Manday/Task	Engineer Engineer	Program mgr Branch chief
Manhour by major activity		
Manday/Task	Individual	Cumulative to VP
Manhours/WBS Task	Computer report	Proj mgr
Manhours/Task	Prog/analyst	Proj mgr
Manhour/Activity	Functional engr	Proj mgr
Manhour/Activity	Individual	Prog cont org
Manhour/Activity Manday/Task	Programmer Prog control officer	Proj mgr Prog mgr
Manhour by job charge (this is related to broad tasks such as programming, subsystem equipment design, etc.)	Programmer	Prog mgr
Manday/Task Manhour/Job charge	Group leader Programmer	Proj engr Programmer
Manhour/Job charge	Programmer	Programmer
Manhour/Job charge	Programmer	Prog mgr

System	Lowest Originator	Highest Recipient
Manhour/Activity	Sr programmer	Dept head
Manday/Task		Prog mgr
Manhour/Activity Manday/Task	Time card, WBS Team members	Proj mgr ADP VP
Cost data	Time cards by individual	Division mgr
Manhour/Activity	Individual	Staff
Person-Hour by Function	Integration	Proj mgr

QUESTION 96 List productivity indexes such as lines of code, program errors, sources of errors, turn arounds required per completed task, etc., that were employed in monitoring performance.

ANSWERS

Documented pages, threads, computer time used, problem reports/corrections, lines of code.

Lines of code - tracked; not absolute measures.

8 lines of code per day.

Productivity monitored at module level, since lines of code per module were constrained by standards. Complexity factors weighed in. Performance then evaluated on turn-around, correctness, efficiency.

Lines of code, number of compilable units.

Lines of source code, number of modules.

Lines of completed code/per manhour.

Lines of code, error reports, machine time utilization.

Program errors.

Lines of code, program errors, sources of errors, turn-arounds required per completed task.

Modules completed, lines of code.

We indeed use such indexes. We are currently establishing a data base of such indexes.

Lines of checked out and documented machine executable code per hour.

Lines of code.

Rate charting for module productivity.

Program errors and lines of code.

Dollars/lines of operational, documented software.

Unfortunately - none.

Did not use productivity indexes.

Lines of code.

QUESTION 105h What was the title, position, and affiliation of the chairperson of the formal reviews?

ANSWERS Grouped by relationship to project

a. Project Manager

Manager ADP

Project manager

Computer subsystem manager

Data processing manager

Software manager

Group leader or project leader

Project manager or person appointed by him

SE/TD project manager

b. Senior ADP Manager

Director

Director computer programming

Software program design manager

Department head

Director to chief

Department manager for software

Software divisica manager; reported to the program manager.

c. Senior Non-ADP Manager

Director

System engineer for the system of which a given software product was part.

d. Customer

Project engineer (customer)

Customer project manager

e. Technical Director

Technical director

Technical leader

Systems engineer

Systems engineer, contractor Assistant Project Manager

Lead software engineer

f. Corporate Staff

Vice President and general manager

Management analyst, Integration/control office of mission group.

g. Varied

Varied - reviews generally chaired by prime contractor

Varied

Depends upon the level of the review

Varied from vendor representative to Director of Related Systems functions

h. Review Board

Design review board chairman, systems engineer

Review chairman

Director, Quality Assurance - Reporting to company president

QUESTION 109 Give title, position and affiliation of chairperson of Configuration Board.

ANSWERS Grouped by relationship to project

a. Project Manager

Program manager

Project manager

Project leader

Project manager assigned a senior person

Project manager of project

b. Software Project Manager

Computer subsystem manager

Software controller

System engineer for the system to which a given software product was a part $\,$

c. System/Functional Project Manager

Manager, Systems Engineering (contractor)

Deputy for Operations, program office

Manager, avionics officer

System project engineer

Director of Engineering

Systems engineer for the system of which a given software product was a part

Systems Engineering manager

d. Senior Technician

Chief engineer

e. Corporation Staff

Mr. John Doe

f. Configuration Management/Product Assurance

Software product assurance manager

Configuration management manager

Configuration control board representative

Program charge review board chairman

g. Customer

Project engineer, customer

Joint customer-supplier chairmanship

QUESTION 115 If it were within your power to make any changes in the method or procedures followed in controlling this project what would these changes be, or, if you had resources available to undertake research in the area of planning which aspect would you explore?

ANSWERS

A standing review committee would be established for each project with critical points designated for technical reviews.

Don't apply - T-specifications or CSSR to software development project.

Allow time for an orderly approach to design and design reviews.

Establish definite packages of work and affect regular reviews with milestones.

Schedule walk-throughs. Hold additional formal reviews.

Provide more detailed breakdown of task and associated milestones, effort estimates, etc.

Complete top-down design with walk-throughs.

Keep records of time by activity. Document changes more formally.

More formal design reviews for different levels of software/engineering activities.

Formalize coding standards - loosen up on 50 lines of code per program.

Development of automated procedures would be of assistance.

More tools.

More effective ways to estimate impact (cost, schedule) on new change requests.

Formal configuration management, improved software library and link system.

Earlier configuration control, base-lined, software requirements.

More strict adherence to base-line with schedule modification (or at least review) for all changes beyond base-line.

Would minimize involvement of the agencies and departments who have the capability to restrain yet do not have potential to advance development (work) efforts.

Use walk-throughs.

Start CM procedures - for this project it started the second time around (design context) after four project managers had their chance to get it up.

Aids permitting automatic collection of development status data, without requiring frequent input from individual contributors.

Configuration management with change control, baselines, etc.

Institute formalized project control procedures including full range of documentation and management configuration control from concept through implementation and follow on maintenance.

QUESTION 118 The title and position of the project manager's supervisor was:

ANSWERS Grouped according to relationship to project manager

a. A Senior ADP Manager

Chief, Data Automation Branch

Chief, Digital Applications

Manager, Software Systems Development Department

Operations manager, project review authority

Operations manager, software systems operation

Chief, Scientific Applications Branch

Branch head, Programming Techniques Branch

Software Engineering Division leader

Four group engineers or supervisors in charge of software engineering, applications software systems and display, software and data systems test, and integration

Director - site facility

Department manager

Department head - systems programming

Director computer center

Director, software development

Department manager - third level supervisor

Assistant director - Business systems development

Director, Operations

Computer system officer

b. Senior Non-ADP Manager

Operations director

Director of development

Director of engineering

Assistant manager, Engineering Operations

Manager, Systems Analysis Department

Avionics chief engineer

Manager engineering

Considering the software group leader as project manager, his supervisor was Systems Group supervisor

Senior director

Chief engineer

b. Senior Non-ADP Manager

Manager, Avionics Systems

Section manager

Program/Component manager

Department head

Avionics manager

Branch head

System project engineer

Project leader

Engineering project leader

Project engineer - development manager

Director

Engineering supervisor

Manager development engineering

Section chief

Section manager

c. Program Manager (as opposed to project manager)

Program manager

SPO chief

Matrix - Program manager

Computer Laboratory Manager

d. <u>Corporation Officer</u>

Program Vice President

Vice President

Vice President Federal Systems Divisions

QUESTION 120 This question reports the title and position of people reporting directly to the project manager. However, very few surveyees completed the POSITION answer of the Question. It was felt by the authors that this indicated that the title a person had was also his position.

ANSWERS This is the only place the clear text answers to Question 120A and 120B appear. The tabulation sheet "blurs" the different titles used by the project personnel. The answers to Question 120g appears in parenthesis under the last number.

Posit_on	Number
Section mgr	1
Section mgr	2
Section mgr	1
	(4)
	1
	1
	(2)
	1
	4
	(5)
	3
	7
	1
	1
	(12)
	5
	1
	1
	12
	(20)
	5
	22
	3
	(30)
	1
	3
	(4)
	Section mgr

Title	Position	Number
Project analyst (ours)	Chief programmer	3
Project analyst (ours)	Technical coordinator	1
Programmer/analyst (ours)	Team programmer/analyst	1
Analyst (cust)	Team programmer/analyst	4
Programmer (cust)	Team programmer	7
		(20)
Senior project analyst		2
		(17)
Associate engineer		4
Engineer		6
Senior engineer		2
		(12)
Senior engineer		4
Engineer		7
Associate engineer		3
Librarian	•	1
	•	(15)
Computer hardware		1
Avionics Interface hardware design		1
Computer SW designer	•	1
		(3)
Software engineering	Manager	20
Software development	Manager	35
Computer operators	Manager	30
Plans/controls	Manager	10
	5 °	(95)
Engineering specialist	Level 25	5
Engineering specialist	Level 27	2
		(8)

Title	Position	Number
SW development		1
SW Programmer/analyst		1
SW Configuration mgn		1
SW engineering		1
Administrator		1
		(5)
Senior analyst		1
Programmer		2
Engineer		2
		(5)
Task leader		2
Engineer		2
Programmer		2
		(6)
Assistant Project manager		8
Secretary		4
		(12)
Mathematician	Analyst/programmer	1
Mathematician	Administrator	1
Mathematician	Tester	1
		(4)
Head SW engr (ours)		1
Head SW engr (Contractor)		2
Programmers		3
Librarian		1
Analyst		1
		(8)
Managers		6
Deputy director		2
Staff assistants		4
		(12)
Technical director		1
Team chief		7
		(8)

<u>Title</u>	Position	Number
Program analyst		10
		(10)
Engineers		25
		(25)
Group engineer	SW engineering	1
Group engineer	Applications SW	1
Group engineer	Sys analysis & display SW	1
Group engineer	Data sys test & integration	1
Secretary	Secretary	1
		(6)
Software requirements	Supervisor	6
Flight/Mission SW design	Supervisor	11
Automatic test equip SW design	Supervisor	10
Software product assurance	Supervisor	8
		(35)
Manager - system		1
Manager - application		1
Manager - verification		1
Manager - program control		1
		(350)
Data an 11 ysts		10
		(10)
Programmer analysts		10
		(10)
Junior programmer		1
Programmer		1
Asst Engineer/Programmer		1
Assoc Engineer/Programmer		1
Engineer/Programmer		2
		(6)
Functional team leader		3
Programmers		7-9
		(10-12)

<u>Title</u>	Position	Number
Analyst		6
Programmer		2
Lab integrator		4
Aircraft operations		3
		(20)
Design head		1
Programming head		1
Test team head		1
Chief analyst		1 .
		(4)
Project SW manager	Line supervisor	15
Test engineer	Line supervisor	15
System engineering	Line supervisor	10
		(50)
Senior engineer		4
Specialist		1
•		(15)
Member Tech Staff		3
		(4)
Section heads		3
Group heads		8
Technical staff		3
Programmer/librarians		41
		(55)
Secretary		0
Programmers	Member tech staff	3 teams of 2, 3, 4 people each
Test/integrators	Member tech staff	3
Project manager	Member tech staff	1
		(15)

<u>Title</u>	Position	Number
Programmer/analysts		20
		(20)
Group leader		3
		(12)
Supervisor	Applications supervisor	1
Hardware analyst	HW evaluation & install	2
Data base analyst	Install data base design	2
		(35)
Gp leader - applications		1
Gp leader - systems programmer		1
Gp leader - HW engineer		1
Gp leader - Standard systems		1
	(appr	ox 32)
Programmer		
Analysts		
Computer specialists		(100+)
Deputy Project manager		1
Task managers		6
Project secretary		1
		(8)
Deputy project manager		
SW Division manager		
Systems Engineer manager		
Operations manager		
		(50)
Computer specialist	GS-12	4
Computer specialist	GS-11	5
		(16)

<u>Title</u>	Position	Number
Senior programmer		1
Advisor programmer		1
Staff programmer		6
Senior associate programmer		4
Advisor analyst		2
Staff analyst		9
		(29)

QUESTION 127 If you had it within your power to implement changes in the way this project was directed, or had the resources to devote to research in this area, what action would you take?

ANSWERS

Greater delegation of authority, responsibility. Clearer assignment of responsibility.

Obtain a better match between the experience of the personnel and the requirements of the project.

Perform basic research in software lifecycle cost.

Less centralized control by the project manager.

Increase control/interaction with functional group developing the company proprietary software.

Delegate more to technical subordinates.

More resources devoted solely to highest level project management.

Would add more formality to the line organization.

Assume a knowledgeable and competent project manager was assigned during the entire project life.

QUESTION 133 What, if anything, could the project manager have done to improve his ability to meet the schedule?

ANSWERS

Insisted on a formalized system of changes.

Firmly establish methodology/design before implementation.

Have authority over all phases of the program, not just software.

Insisted on firm baseline.

Insist on firm baseline after the requirements phase.

Nothing - requirements changes are vehicle orientated not software.

Have a better estimate of the job initially.

Use basic management techniques and employ more \$ and people - early.

Better original estimate. Negotiate schedule change with each requirement change.

Restrict number of modifications and suggestions allowed.

Enforce structured code walk-through earlier.

Bid more manpower, in particular in software documentation to meet milestone - Progressive build up of the software product specification.

An earlier agreement on the definition of system requirements.

Improve support received from other organizations - on time delivery of target computer and hardware test beds.

Should have had formal documentation milestones/software management plan.

Stick with basic requirements except where a change is required to meet basic requirements. Changes to basic requirements should be reviewed for schedule impact instead of being done with much 0.T.

Minimize number of changes and design objectives.

Overstaff initially to provide trained cadre for the accelerated schedule to come later.

Delay other projects.

Baseline requirements, improve computer access, enforce better design quality standards, enforce more structured programming standards.

Better monitoring and application of resources.

Better monitoring and testing.

Respond to the early warning signals with more aggressiveness and alacrity.

Improve test approach, better control of project resources, increased involvement of true user community, better control over all elements of the project (i.e., company developed proprietary package).

SACRAMENTO AIR LOGISTICS CENTER MCCLELLAN AFB CA SERV--ETC F/6 22/2 RESULTS OF A SURVEY SOFTWARE DEVELOPMENT PROJECT MANAGEMENT IN --ETC(U) DEC 79 R H THAYER, J H LEHMAN SM-ALC/MME-TR-79-54-VOL-2 NL AD-A117 998 UNCLASSIFIED 5 * 5 END 9-82 DTIC

Little requirements or de-scope implementation.

Good software engineering techniques were not used the first time around.

Baseline requirements and ensure that the user is involved and documents the proper test procedures.

QUESTION 137 What, if anything, could the program manager have done to improve his ability to meet the budget?

ANSWERS

Provide more visibility to the impact of changes in order to reduce requests.

Better initial estimate. Firm establishment of methodology design before implementation.

Maintained lower staffing profile until requirements were more firm.

Realism on the part of the customer was an absolute necessity but was not a reality.

Better estimates, better style, better subcontract.

Nothing.

Better initial estimate.

Restrict number of modifications and suggestions allowed.

Freeze baseline.

Bid more realistically.

Bid correct cost in first place. (The program manager at the top can do as ours did. If he does not cut too deep, one element may overrun, but whole project would be on or under cost.) Apply modern software design techniques.

Phase staffing. Plan the staffing to be commensurate with the development activities.

Delete documentation requirements.

Take a harder approach with the customer to make his requirements more firm and more unified.

Allow contingency, indirect rate changes.

Baseline requirements and ensure that the user is involved in and documents the proper test procedures.

Limit requirements or de-scope implementation.

Update projections based on experience rather than wishes.

Closer review of design.

Better accounting procedures, baseline requirements, improve computer access, enforce better design quality standards, enforce more structured programming standards.

Earlier definition and freezing of requirements. More pressure on customers to supply requirements and limit them.

Act more aggressive toward demanding test plan earlier and to a more detailed level.

Improve test approach, better control of project resources, increased involvement of true user community. Better control over all elements of the project (i.e., company developed proprietary package).

Delayed staffing, thereby missing initial milestones which later proved to be misdirected.

QUESTION 148 Was the delivered system useable? If so, how was this determination made?

ANSWERS

Yes - After fleet training, system went into operation and replaced previous system.

It was deemed useable by a complete user evaluation and test at his site.

Yes - Company and customer demonstration during development phase.

Accepted by user as operational.

In operation, supporting system evaluation and fleet exercises since 1974.

Yes - test.

Presently being determined.

System has been used in demonstrations but not delivered to users.

Capable of performing task for which it was designed.

Technical and operational testing in the field.

System not yet delivered.

Not yet completed.

[it] Is in production; [it] is being used by non-computer types on daily basis.

Yes - operational field tests.

Not yet delivered.

Through use.

Real system tests using live data. Data evaluation showed system met requirements.

Ability to check out and fly the vehicle without conscious effort to "deal with" the problem.

Combined DT&E/IOT&E.

Flight test.

The user ran the system.

Demonstrating the use.

Passed the designed tests.

Independent testing by several agencies before delivery followed by monitoring of full use.

Yes, through testing by independent contractor and operational usage.

Yes - review of operational utilization.

No, did not respond fast enough to user demands.

Yes, demonstrated integrated operation in complete weapon delivery system.

It's still in use.

Availability factor to support active flight test programs.

Yes, it satisfies the user (requirements).

Yes, it was subjected to an operational test by the user.

Presently being used.

Yes, continued use by customer.

Flight test.

Satisfying the avionics integration requirements - hardware and software working together.

Through testing and verification.

Not determined.

Turn key system used for factory/depot testing designed for manufacturer, machine interface, etc.

Customer field tests.

Demonstration.

Through operation.

Field exercises in competition with another customer's systems.

Customer was satisfied.

Yes, used for both launches - but painfully!

System was usable, but not up to expectations of users.

The user group used for daily operations. Prior systems were scrapped day I.

Still in final system acceptance testing.

By the users "real" application, immediately after delivery.

Product test with user involvement.

The jury is still out.

QUESTION 159 Give some lessons learned from this project.

ANSWERS

Delegate responsibility and authority: maintain communications.

The interface with an IV and V contractor is much more time-consuming than estimated. Customer interface at a detailed level is costly.

Must have well defined, fall-back position to go to if problems develop. Must hold line on new suggestions and changes introduced.

Make sure development/test tools are ready; automate the process as much as possible.

Establish requirement clearly before designing; establish design clearly before programming. Give more attention to planning and effort/cost estimates. Need greater documentation of decisions, specifications, and design.

Careful building of requirement specifications to facilitate testing pays off, configuration control pays off, integrated engineering/programming team pays off.

Must have firm base line; good documentation of higher levels of effort must precede lower levels of effort.

Sound management (a la hardware projects) works well with software projects.

Streamline requirements before software development.

Good foresight and planning very essential.

Good management goes a long way. Do front end work well, get a good sub-contractor and good sub-contract. Develop good management visibility too. .

You assume you know the project managers main goal!! in Question 158. [To deliver on time, within budget, and meeting the requirements of the system, where the final software product is reliable, maintainable, and useable.] If the contract has been properly written (an incentive contract), the project managers objective is to maximize profit! If he does, the customer should be happy because the contract will have steered the project manager and the customer wrote the contract! If there is no requirement that the software be reliable, maintainable and/or useable, the project manager should not have these as a major goal. On time, yes! Within budget, yes! Meeting requirements, yes! But more than that not necessary. Sometimes though, contracts are not written to reflect the true desires of the customer. Therefore, when project manager goes to maximize profits, the customer is not necessarily happy!!!

1. Documentation and flow charting more expensive than thought. 2. The average software designer fails to see the need for documentation or discipline until job is near completion. 3. Documentation, discipline, good configuration management, sound planning, detailed schedule commitments, software design standards, error tracking, top-down design and combined top-down/bottom-up testing pays off.

More strict monitoring and enforcement of standards and roles is needed.

Enhanced programmer professionalism is extremely important. Need better reporting mechanism. Need automated means of monitoring programming and design progress.

- 1. Require intense interface with user community. 2. Increase the planning phase. 3. Complete detail design prior to code initiation.
 4. Require full system walk-throughs. 5. Increase formalization of planning. 6. Do not build test team from original project personnel to transition to a testing function. 7. Dedicate project teams to individual projects. 8. Implement a separate test function at project initiation. 9. Create a separate documentation function. 10. Have documentation performed by other than programmers. 11. Keep personnel on project for duration of project. Do not remove them even to put out brush fires. 12. Improve communication between lower level management and team member level. 13. Require everyone to comply with project controls. 14. Complete test plan. 15. Have better control of project resources.
- 1. Requirement maturity less than originally stated. 2. Development tool (including facility) inadequately specified. 3. Computer memory insufficient to satisfy the computation load. 4. Staffing plan not consistent with development activities.
- 1. Highly motivated inexperienced staff can consistently out perform less motivated senior staff. 2. Never believe anything a computer vendor says.
- 1. Keep software test in the software project team. 2. Use rate charting to monitor, include status on manual basis. 3. Have good standards and conventions. 4. Develop support software early. 5. Have software project control facility and facility scheduling. 6. Keep close coordination between test and programming groups.

Use standard vendor supply operating system. Use of high level language, more walk-throughs, more formal specifications.

Be sure the system design is feasible and practical before beginning software design.

1. Independent test team essential. 2. Develop sizing/timing budget for modules and monitor and maintain.

Need aids and support librarians.

Proximity of laboratory, computer facility, test bed and people to each other is the key.

A detailed computer program development plan (CPDP) must be completed early (within 30 days after contract award).

Documentation must be developed during the computer program development. This takes manpower and time which was not planned and allocated.

Require that software is tested by a separate group.

Peer reviews should be used.

1. Politics plays a more significant role than pure technical consideration. 2. Even the presence of a few super stars on the team does not guarantee success.

Pick team carefully, insist on full range of documentation, employ configuration control, use walk-throughs, estimate high - expect the worst, develop accurate/reliable reporting techniques. Control the project.

Need to spell out specifications system, requirements with CM procedures, change control, baselines; more user involvement, product test plan by user.

Detail requirements definition; code walk-throughs; early test planning; extensive engineering documentation: very, very important.

Do not let customer dictate schedule, design and configuration without contractor concurrence and agreement.

Need to spell out specification requirements with configuration management procedures, change control, baseline, more user involvement, product test plan by user. Scheduling around holiday causes delay. "Programmer is a programmer is a programmer" isn't true. Extensive time away from home costly and hard on personnel with compensatory time higher than needed.

QUESTION 164 (Formerly Question 25 of PART THREE of original survey form) Please furnish any additional comments or statements concerning this survey or the science of software engineering project management.

ANSWERS

Hope you get many completions, hope you can digest this, good list of though items. Suggest followup interviews with selected submitters to get "personality" of company/project.

There appears to be an over emphasis upon quantifications of subjective functions. It is more important to define visibility methods and automated procedures to keep programmer ingenuity out of straightforward program design.

Software engineering management differs very little from the R&D or prototype development of hardware. Unfortunately there is a tendency to compare software development, which has no real production (repetitive) phase with the production phase of hardware development. Software development is a design and test effort.

Many of the questions asked, especially in Part 3, are philosophic in nature. Software engineering is still at issue as a discipline. I believe that many approaches to managing software are valid, and that many problems result from [failures in]: 1) the application of uniform standards, and, more important, 2) the commitment to enforcing such standards. If this results in additional initial costs during the development of projects the savings will off-set that cost, many fold over the life of the system.

Software development is a very tough management problem. It isn't clear whether formal techniques are a significant aid, and, if so, whether they justify their overhead. Honest, published case studies addressing those questions are needed. Time and effort estimates, especially, are a problem. Software projects are chronically subject to cost overruns and schedule overruns, or alternatively, failure to fully meet objectives. How can this situation be overcome? I found it difficult to relate much of the survey to the particular project I was addressing. Primarily, this was because the survey presupposed orderly progress from a clear starting point to delivery. The project didn't (and probably couldn't have) gone that way.

Seems to be a universal difference between the way things are and the way they ought to be. Primary case in point is the extensive modifications necessary in most specifications subsequent to their initial development. This has a ripple effect on software development down stream. Until such time as the perfect specifications writer is born, some small part of the "science of software engineering" will remain an art, and hence, undefined and unmeasureable. We should probably accept that, and realize that all decisions cannot be made on the basis of 100 percent accurate information. The survey itself was exhaustive and exhausting. It will be interesting to see if general conclusions can be drawn from these questions, particularly from projects which do not necessarily "fit the mold". Good luck.

This data should be collected by interview instead of a standard form due to the varying organizations and projects.

The answers to this questionnaire are based on a by-gone project, and do not necessarily represent the way [we are] now managing and developing software.

I wonder how many souls had the patience to go through this questionnaire. Good luck! The following are extracts from correspondence received by the authors from the Surveyees.

Correspondence Extract 1

We had a bit of a problem in trying to construct answers which would be meaningful and reflect the true state of affairs at our Division.

We are a Division of a Parent Company. Consequently, we can be viewed as a corporate entity, as a division, or as part of the total corporate entity. I chose to regard ourselves as the total entity for purposes of answering this questionnaire. The only exception to this is the answer to one question in which we have a corporate systems group which are used in evaluating any purchased software. This is a response to Question 32, Part I.

Another difficulty which I encountered was interpretation of whether the questions should be addressed only to what we call our data processing group who are responsible for the general divisional computer use. It is this group which generally writes the business programs, e.g., payroll, inventory, bill of materials. In addition our product involves the computer in essentially every case. Consequently, we have a large body of people who program computers for the product which we sell. In order to accommodate these two diverse activities I have had one questionnaire filled out by data processing to reflect activities for which they are responsible and the other filled out by different people dealing with the actual product. Typically we may refer to what they are doing as applications programming.

A further complication arises in that we have a group of software specialists who write special software in support of the applications programmers. These people write edits, debug routines, maintenance and test routines, library routines and the like. Their work gets very similar to the kinds of programs that we would generally be buying for the data processing group from outside sources.

As you can see we are somewhat complex and interpreting our data may be difficult for that reason.

Correspondence Extract 2

Just a note - thank you for the opportunity to respond. Some comments follow:

The questionnaire was very difficult to answer in some areas - interpreting/applying the question to our project was often frustrating.

The emphasis was on ADP - but I believe, for real-time systems - that the true significance has been missed. The thought is this: the engineering has now moved into the computer, rather than being realized as discrete logic, etc. Your "analysts" may be skilled, but it can't be done without the software-knowledgeable, system-knowledgeable engineer.

My encouragement to you on this survey and the consolidation of responses.

Correspondence Extract 3

As I told you in my phone call I am seriously concerned that the answers to this questionnaire may be misleading. The questionnaire seems to me to embody a number of assumptions about organization, personnel, staffing, work flow, responsibility, which are applicable to a traditional data processing center, but which are less appropriate — or even wrong — in the effective engineering uses of embedded computers. At least we do not do things these ways [. . . .]. I am concerned because the thrust of new DoD directives and policies is in the direction of concepts that frankly I consider obsolescent and inappropriate.

Correspondence Extract 4

Enclosed please find the completed survey forms. We apologize for our delay in responding, but the forms arrived while the primary respondents were on vacation.

. . . two programs [were] reported on.

[The first] project was characterized by the judicious introduction of advanced software techniques and very strong project management and reviewing practices. (As an example of the latter, the software was treated as hardware under the same configuration control system.)

In summary, the computer systems were delivered on schedule and slightly under budget. After two years of continuous use very few software errors have been detected.

The [second] project was one where almost no advanced software or management techniques were used, and yet the program culminated with a successful . . . test . . . within budget and on schedule.

In conclusion, we hope these responses reach you in time to be of use and we look forward to meeting with you and seeing the results of the overall survey at the AIAA Conference.

Correspondence Extract 5

In response to the referenced letter, we have enclosed three different completed copies of your software development questionnaire marked (A), (B) and (C). Each of the questionnaires was completed by different group supervisors in our Programming Development Section.

. . . Their responses are candid, their own and no higher level organizational image polishing has been applied.

Your questionnaire aroused much interest . . . and numerous copies of the questionnaire were distributed for evaluation, comment and discussion. Needless to say this Section has an excellent record, but they are continually seeking improved techniques for increasing the overall productivity of their software development teams. The persons completing the questionnaire believed that the exercise was fairly time-consuming, sort of soul-searching, but very worthwhile.

Correspondence Extract 6

I greatly regret the delay in providing the enclosed data which was promised to you for a much earlier date. In part, interestingly enough, this delay relates to the subject of the survey in that we have been examining our organization's approach to software development and are in the process of revamping both the organizational structure and the methods and procedures used in connection with the development of embedded software. We expect by this means to improve both the quality of our product and our efficiency in producing the high quality software our customer's require. Again, please accept my sincere apology for the extended delay. Thank you.

Correspondence Extract 7

I have struggled through the questionnaire and filled it out as best as possible. It seems to be aimed at the big project with lots of people, lots of management, documentation, configuration control, etc. These are all things which, in my judgement, guarantee failure and overruns (usually both). I have become convinced that the only way to manage complex software projects is with a small group (not more than ten) of competent people. If the project is large, it must be developed incrementally.

Telephone Call Extract 8

Mr. "Smith" called concerning the survey. He thought that the survey was super, well-liked by all of them at his organization, and he asked permission to use it as internal survey to determine how their developments were going. Apparently Mr. "Smith" and his Corporation need some means of keeping software project history. They view our survey as a means of doing this.

Correspondence Extract 9

Here it is at long last - warts and all. Good luck.

DATE FILME